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OF

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OUTLINES

OF

DESCRIPTIVE PSYCHOLOGY

A TEXT-BOOK OF MENTAL SCIENCE

FOR

COLLEGES AND NORMAL SCHOOLS

BY

GEORGE TRUMBULL LADD
PROFESSOR OF PHILOSOPHY IN YALE UNIVERSITY

NEW YORK
CHARLES SCRIBNER'S SONS
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PREFACE

THIS book has been written with a definite intention constantly in view. In size, selection and arrangement of material, style, and mechanical structure, my effort has been to adapt it to certain beginners, with an average grade of culture and amount of time at disposal. In a word, it is — as its title designates — a *text-book* of the science of psychology for colleges and normal schools. I have, therefore, had in mind, from first sentence to last, both the pupil and the teacher in their mutual relations. No pains has been spared to make the presentation of the subject such that it can be intelligently and "economically" yet thoroughly studied and successfully taught.

It will doubtless facilitate my general purpose if the explanation of it is extended into a few particulars. And first, attention is called to the fact that this work aims to give a complete but summary treatment of the phenomena of human mental life, from the different points of view, and with all the methods of research, which belong to modern psychology. The aid of experimental and physiological investigations is constantly sought. But these investigations are — at least at present — almost entirely unable to deal with the later and more complex developments of the mind. Unless we describe, and as far as explain, the growth of intellect, the knowledge of of Things, the formation of the higher sentiments tions, and the conditions for the attainment of , we neglect the main part of the task of the gist. Our picture of the mental life may have a appearance, but it is not at all the faithful picdeveloped human mind. In aiming at what is, best called the "balancing" of the material, I d to give these "higher faculties," without neghe treatment of more fundamental processes, the of space they naturally deserve and require.

ethod which I have followed is both analytic and The First Part describes those elementary forms ioning which analysis discovers as entering into l life. The Second Part traces the evolution of inal "faculties" of mind, as much as possible in investigators. On the contrary, commendatory or critical reference to others has been freely introduced; and a very brief bibliography, which it is hoped will lead the student to wider reading, has been appended to each chapter.

In the style of presenting the various subjects I have tried chiefly to secure clearness, conciseness, and order. These seem to me the more important qualities in such a text-book as this aims to be. But these qualities make it impossible to introduce lengthy stories or disquisitions aside, or other interesting illustrative material. The pupil, on his part, should begin the science, as he should begin every scientific study, with the determination to do honest and faithful work. This determination will soon secure a more intelligent and lasting interest in the subject than can otherwise be gained by any devices of the author, however skilful. But the teacher on his part is left free to supplement the text-book from his own resources, and to stimulate the pupil to draw upon all his own experience for illustrative and life-giving details.

A few words are also needed to place the present work in its proper relations to other works on the same subject by the same author. The "Elements of Physiological Psychology" and the "Outlines of Physiological Psychology" are not at all displaced by this book in the use of those who wish to study mental life with more detail, from the experimental and physiological points of view. Indeed, where there is time for this, reading of one of the physiological psychologies may be combined with the use of the present work. For younger pupils, or those who have less time, the "Primer of Psychology" will still be while more advanced students, and beginners more leisure for reading than belongs to the ssroom, or who object to the definitely text- of presentation, will probably prefer the larger gy, Descriptive and Explanatory."

to make grateful acknowledgment of the help om my colleagues, Professor George M. Duncan dward W. Scripture. Professor Duncan read nuscript and made many valuable suggestions lapting the book better for classroom use. ure has greatly assisted in preparing the dia- several of which are of his own devising, — arefully scrutinized the experimental material. ese gentlemen have read all the proofs. I feel experience as successful teachers, added to the of the author, may reasonably be relied upon

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OUTLINES OF DESCRIPTIVE PSYCHOLOGY

CHAPTER I

INTRODUCTORY

Definition of Psychology. — Although it requires much time and study to form a worthy conception of the science (its nature, method, and aims) of which we are to treat, the following preliminary statement will be of use: *Psychology is the systematic description and explanation of the phenomena of consciousness, as such.* For the phrase "phenomena of consciousness," such terms as "conscious states," or "processes," "psychical (or mental) activities," or even the technical word "psychoses," may sometimes be substituted. For the principal classes of these phenomena the familiar words, sensations, feelings, ideas, memories, imaginings, thoughts, sentiments, decisions, choices, etc., must often be employed. What all these conscious states in fact are, and what conditions accompany and determine them, every adult knows to some extent by his own experience. But the complex *structure*, so to speak, and the manifold *causes* and *connections* of many of them, still baffle the supremest efforts of expert inquirers. What these phenomena actually are, as conscious states, and how they come to exist and to follow each other in the order which they in fact assume, forms the primary subject of the investigations of psychology.

Our definition has restricted the sphere of psychology to conscious states, or psychoses, *as such.* This rather way of helping out the formula is necessary, for ving reasons. From a certain point of view (and ne distinctively psychological), all the sciences regarded as only "systematic description and ion" of man's conscious states. Science itself is psychical activity; it is systematic and verifiable . And since there is no such thing as knowing l, every scientific fact or law is, in what is called *tive* aspect, somebody's perception, imagination, ion. That which, for the scientific botanist, is ing, a tree or a plant, is for psychology a "phe- of consciousness"; it is in either case a percep- onception to which the attribute of "scientific" or tific" may be ascribed. The scientific geologist, ers the facts of his science only by his own obser- r by belief in the reports given by others of their ons, — in either case, helped out by imagination nory. His scientific generalizations are, there-the men who observe the facts, and who think out the connections between the facts. But this is to affirm that physics, chemistry, geology, botany, and all similar forms of knowledge may be regarded as in some sort "subjective." On the other hand, when I consider my own thoughts or imaginings, and when I reflect upon the nature of the being which can behave in this way, — can be said to "have" the thoughts and imaginings, — I am making these psychical processes and psychical powers the "objects" of my observation and reflection. Sensations, as truly as stones, — beliefs, as actually, though not so successfully, as bees and beetles, — volitions, as undoubtedly as volcanoes, — can be made the objects of scientific investigation. Yet the psychologist's point of view is properly called subjective.

The more important bearings of this distinction between the subjective and the objective cannot be made clear at present. But there can be no doubt about some items of our experience which enforce the distinction. I am the owner (in German the *Träger*) of my conscious pains and pleasures, of my thoughts and sentiments, as I am not of any of the natural objects which belong to me. In turn, your feelings and thoughts are "yours"; and those of the third man yonder are "his"; they are neither yours nor mine. Conscious states, as such, are always and unavoidably held, by the one who observes or reflects upon them, to belong to some conscious subject, or Self, whose states they are. Only the subject of these conscious states can make them the immediate object of observation. Only the signs or manifestations of them can be observed by others: such as the eye that kindles with love, or the cheek that flushes with anger, or the action that follows the decisive choice. On the other hand, the owner, or subject, of the conscious states does become aware of them as no other observer can. His knowledge is — at least, to some extent — internal and subjective, while the knowledge of others can only be external and interpretative. But more in regard to this distinction will follow in other connections.

Assumptions of the Psychologist. — The student of mental life can no more dispense with all assumptions than can the student of any form of particular science. Psychology has as much right to its list of facts and truths that are taken for granted as has either physics or biology. No attempt will here be made to give an exhaustive treatment of the legitimate assumptions of the psychologist, or even to enumerate them without omission of any. Neither can the psychologist, any more fitly than the devotee of any form of physical science, be called upon to define all the terms, or to analyze completely all the conceptions, which he is obliged to employ. The following, however, should be noted as among the most important.

It is assumed that there are such facts as conscious processes, or psychoses. But to assume this is only to admit that men perceive and feel and reason and choose; and such an admission no one can fail to make. On the other hand, a scientific definition of consciousness cannot be given, and it is foolishness to seek it. For definition implies science; and science itself, from the psychological point of view, we have seen to be an elaborate collection of related conscious acts. To define consciousness would, then, be to resolve what is most primary and elemental into what is bewilderingly complex, and uncertain.

It is also assumed that conscious processes may be observed and studied, and that, as a result of such consideration, they may be the better understood. The immediate evidence for this assumption lies partly in every one's experience; but fuller proof requires an examination of the method of psychology and of the doctrine of self-consciousness. The treatment of these topics will follow later.

It is further assumed that conscious processes are connected with each other. In some valid meaning of the words, the sequent mental facts are dependent for their character and origin on previous mental facts. Mental phenomena are not chaotic or wholly oblivious of law and order. Since all the ordering of facts and the total conception of law, which "science" implies, are primarily of mental origin, the mental processes, as such, cannot prove wholly disorderly and unsubmissive to law.

It is assumed, finally, that many of our conscious processes — and mental life generally — are dependent upon a variety of external conditions. The common experience of men justifies this assumption. Indeed, without making it, we can scarcely see how experience itself would be possible. It is, of course, unscientific to begin psychology with such an assumption as this: "The immediate condition of a state of consciousness is an activity of some sort in the cerebral hemispheres;" or with any similar statement taken for granted. In a preliminary way, psychology does not even so much as know whether there be any cerebral hemispheres. But the psychologist, like the student of physics or of chemistry, is obliged to assume that "things" do exist, and that they furnish conditions for the origin, order, and character of many of our conscious states. For example, I cannot investigate the mental phenomena of sensation and perception without referring them to the existence and action of the thing perceived by the senses. The whole doctrine of the quality and quantity of sensation, and of the arising and growth of the knowledge of natural objects, connects psychology with physics, with chemistry, with physiology, and with biology.

The ultimate nature of the Mind, the reality of Things, and the actuality of those causal relations which every one assumes to exist between things, are subjects for pro-

losophical inquiry. It is, indeed, difficult for
ologist to avoid introducing such subjects into
sion of mental phenomena. Without disput-
sent as to how far metaphysics is desirable, or
ssary, as an admixture in psychology, we simply
n taking at the beginning a naïve and common-
t of view. There *are* things, — to be perceived,
ed, thought about, known, and acted upon; and
ceiving, thinking of, knowing about, and deal-
hem, these things influence us. There *are* also
t perceive, remember, think, know, and act upon
They are called "Minds," and it is the facts and
eir life which psychology investigates.

gy as Science. — After what has just been said,
almost needless to raise the question whether
y can claim for itself a scientific character. If
is meant a system of indubitable facts and
stablished that deductions from them amount

gained its principal successes thus far in the way of enlarging the *descriptive history* of mental life. Description is, of course, the primary thing in laying the foundations of every science. *What are the facts?* We need first to have them accurately and fully described. We need also to have them described in a genetic way; in a way, that is, to correspond with the order of their rise and development. This is the great need, and it is the fundamental achievement of all biological studies. Study of all things that are *alive* has thus far resulted, for the most part, only in an accumulation of descriptive histories. Why the facts are such as we find them to be, and why they are so arranged and connected, it is in general impossible to say. To describe, with keen analysis, helped on by experiment and in dependence upon cognate sciences, the phenomena of consciousness, is the primary aim of psychological investigation. Its principal modern achievements are in the fields of such description. But this aim is subordinate to a more ultimate aim. The supreme final purpose of psychology as descriptive science may be defined as follows: *To give an accurate and full history of the development of that form of life which we call the Human Mind.*

Psychology as Explanatory. — No genuine scientific endeavor is satisfied with mere description. Explanation both accompanies and follows, though usually in a lagging way, the course of descriptive science. In the stricter meaning of the word, *science* begins only when a knowledge of conditions and causes is joined with a knowledge of facts. The psychologist always keeps this aim steadily in sight. He, too, is never satisfied simply to know what the facts are, but ever strives to ascertain under what conditions, and as due to what determining causes, the facts occur. He particularly desires, where this is possible, to establish an accurate measurement and to take the relative

conscious states; as well as to connect them, in
wider and yet wider generalizations, with that
fe of nature which constitutes the environment
lividual mind.

ations in psychology may, in general, proceed in
of several directions; or, rather, each of several
s must be followed in order to obtain the fuller
on of mental processes.

the more elaborate mental processes may be
by analyzing them into the simpler and more
ry processes. For every conscious state, espe-
the adult mind, is exceedingly complex. And as
develops, the complexity of its processes in gen-
eases. "Explanation" by way of psychological
has been compared to the work of the chemist;
are striking likenesses existing between the two
scientific research. But there are yet more strik-
rences. For mental processes, such as the more

used to explain these processes. This form of explanation renders psychology dependent upon physics, physiology, and biology; and it results in establishing important connections between it and these other sciences.

Third, the psychologist aims to explain the later phenomena of mental life by dependently connecting them with the earlier phenomena. In doing this he is always, indeed, obliged to confess that his explanation is not complete. For there is something other and more in the later stages, where these are also the "higher," than can be found in conditions furnished by the earlier and lower. But, on the other hand, the latter do explain the former, in somewhat the same way as that in which a knowledge of the structure of the young tree or young animal explains the maturer functions of the same being. The key to all such explanation is, of course, the complex conception of "Development." Psychology endeavors to give a systematic exhibition of the general conditions and laws which control the evolution of the mental life of the individual man.

Fourth, psychology is just beginning to recognize the immense influence upon the individual of his social environment. It was this which the lines of the German poet emphasized: —

> "Would'st thou make thine own acquaintance,
> Then see how other men behave."

Of this entire great truth, the other side is expressed by the same poet in the lines which follow: —

> "Would'st thou understand thy fellows,
> Of thine own heart take regard."

There is not a mental function of the individual man which is not better understood as dependent upon the social conditions of his birth, education, and daily surroundings.

m of Psychology. — The mental life of the indi-
nan is full of unsolved and difficult problems.
ental process has its peculiar problem, or rather
problems. He who eats and digests his dinner
s the practical answer to questions for which no
gist has a sufficiently full and unimpeachable
The plain man in the daily use of his powers of
a puzzle to the psychologist. Normal perception
nses is no less full of problems than are the illu-
he dreamer or the hallucinations of the hypnotized
sane. It is with an appetite for hard problems
tudent of psychology should approach the subject.
bordinate problems, however, may be merged in
reat, inclusive problem before psychology. This
may be stated as follows: *To understand the real*
that mental life of which all conscious states are
and parts, and to know the conditions and laws
trol its genesis and development.

Introspection in Psychology. — At the same time there is a way of ascertaining the facts, and, to a certain extent, the conditions and laws of relation between them, which is peculiar to the scientific treatment of mental states. This way, or method, is called "introspection"; sometimes "reflection," or "secondary" or "intentional self-consciousness." True, self-perception is often self-deception. And it has been correctly argued that we cannot even begin to examine our own consciousness, with a view to know its contents, without at once profoundly modifying the very contents we propose to examine. To suppose that what we "think about" our psychoses is a true description of the actually existing psychoses themselves, has fitly been pointed out as chief of the psychologist's fallacies.

On the other hand, the very modification which our activity in self-observation introduces may itself be observed. And he who denies that some sort of "immediate awareness" of one's conscious states is possible runs counter to all human experience. "Surely" — every man affirms with naïve but invincible conviction — "I may know that I have, and when I have, a bodily pain, and whereabouts in the system of bodily localities I am obliged to place it." And how can I doubt that I have thoughts, and what I think about this or that sensible object or abstract question? Only the development of psychological science itself can determine the dangers and safeguards, the risks and fallacies, of the introspective method in psychology.

Reserving further hints for other connections, we affirm, in a preliminary way: *Self-observation of conscious states is able not only to reveal them to us as true objects of knowledge, but also to assist us to analyze those states and to discover their real conditions.* And without self-observation such states can neither be known nor analyzed.

arked improvement which the training of one's powers of ion brings about is matter of indubitable experience with st student of psychology. This improvement is especially or example, in the direct analysis of the overtones which it ossible to detect in the complex musical sound of ordinary e. Another good example is found in the experience of carefully observe their skin sensations, with a view to sepa- ifferent elements which blend in the case of what is called things with the hand. Undoubtedly our so-called "feel- general are very difficult of description and of scientific . But this is not because we are not immediately aware n any trustworthy way. On the contrary, it is of our pres- gs, especially when they are obtrusive and strong, that we directly and unequivocally aware.

iment in Psychology. — While a certain amount of ent has always been connected with investigations ology, the use of carefully prepared and closely experimentation is a very modern achievement. e and success of the so-called experimental method and permanent recent additions to psychological science. Again, when Volkmann rejects both the inductive and the deductive methods and introduces what he calls the "genetic" method, he can carry out his own way of handling mental phenomena only by virtually using the methods he rejects. On the other hand, the "genetic" method, or study of the genesis and development of individual mental processes and of the whole mental life, is characteristic of modern psychological science; as it is, indeed, of all the modern sciences. Some of the most distinguished followers of this method, however, — as, for example, Herbart and his successors in Germany, and Herbert Spencer and his adherents in Great Britain and this country, — have misused this method by substituting their own theoretical abstractions for the actual and living activities of the mind.

Doctrine of Psychological Method. — The complete circle of means to be employed in realizing the aims of mental science embraces observation, analysis, induction, and the framing of theories, — to be tested, when this is possible, by experiment. In other words, the method of psychology is (1) observative of facts, (2) analytic, (3) inductive, (4) genetic, or pursued as a study in development. Observation of conscious states is direct or indirect; the method of the former is introspection; the method of the latter is, in general, interpretation of physical signs. The one is sometimes spoken of as an envisagement of one's own mental processes; the other is an inference from the behavior of others as to what their mental processes are. Analysis, induction, and the framing of a theory of connections between the facts, and of the laws of the development indicated by the facts, are not, as methods of investigation, peculiar to the science of psychology. The scientific method is, however, possible in the study of mental processes, because these processes admit of analysis, induction, and theorizing, on the basis of careful and guarded observation.

Sources of Psychology. — To enumerate all the springs of information and suggestion open to the student of psywould require a survey of the entire field of ental life. His one constant endeavor is to note anifestation of mind, to make it an object of ge, and to explain it in accordance with other known laws of mental life. From the new-born the philosopher Kant, from the idiot or madman otle, all human conscious processes constitute the is science.

nection with introspection and experiment, where r is possible, the following sources of psychology noted: (1) The artistic delineations of human life. These include the drama, poetry, and especially t present, the novel, or prose romantic composition. ll true art requires and displays insight into soul is not, however, the so-called "psychological" r novels which ordinarily have most of genuine able insight.

cial phenomena, and the historical and theoretical children, and even (5) of the lower animals, is necessary to a better analysis of the mature mental processes of man, and to the detection of hitherto concealed factors within them. Such observation is indispensable to the understanding of human mental life as being what it undoubtedly is — a *Development.*

But, finally (6), the student of psychology can no more easily than can the student of any modern science dispense with the reading of treatises which record the results of other's observations and reflections. For this science, too, grows at the hands of many workmen, and he who attempts it in isolation from his fellow-workmen is certain to deceive himself with a pretence of knowledge.

In this brief treatise, no attempt will be made to employ the different methods, or to draw from the different sources, so as to emphasize the distinctions that exist between them. We shall give a brief description of the mental life of the individual man,—its chief processes and its history in development,—availing ourselves on each topic of the results of all the different methods and sources.

Divisions of Psychology. — The entire field of psychological inquiry has been variously divided. A division which was for a long time prevalent recognized two disciplines: Empirical Psychology and Rational Psychology. The former aimed to treat mental processes as themselves objects of experience, and so to establish a descriptive science of these processes. The latter discussed the more speculative problems entering into a theory of the Mind as the really existing subject of mental states. The distinction is valid and should be recognized by all students of psychology. But no author who has treated of the entire "round" of the mental life has succeeded perfectly in carrying out the distinction. *The study we propose is to establish a science which is mainly descriptive, but also explanatory, on the basis of undoubted facts of experience.*

mpirical psychology, or psychology as a "natural"
in the widest meaning of the adjective. But
he explanatory assumptions, certain positions as
al nature of mind and of things, and of the rela-
tween them, are almost unavoidable.[1]

the time of Kant the field of empirical psychology
omarily been divided among the three so-called
ies" of Intellect, Feeling, and Will. For reasons
ill appear in their full force later on, and espe-
cause we wish to emphasize the scientific method
sis and the conception of development, we shall
is division. We shall treat of the phenomena of
sness under two general heads: (1) Mental Pro-
nd (2) Mental Development. The first division
cuss those elementary forms of conscious experi-
ich the analysis of psychological science discovers
and every condition of human mental life. The
ivision will trace the growth of mind in various

faculty" of perceiving, remembering, thinking, etc., this was to confess ignorance of their real causes. Psychological science aims to know under what conditions the mind perceives, remembers, thinks, this rather than something else; and to estimate and approximately measure, as it were, such conditions.

Important truths, however, which the modern psychologist cannot afford to overlook, were implied in the ancient doctrine of faculties. First of all, this truth: *All classification of psychic facts, as immediately known, is accompanied by an implied or express assignment of them to the same Subject of all.* This truth will be more fully set forth in the following chapters.

The basis for the doctrine of mental faculties consists in the fact that the complex experiences of our daily lives differ greatly in their more important characteristics, and yet that characteristically like experiences are frequently recurring. For example, we are suffering with toothache or headache, one day, and another day, we are enjoying ourselves in the open air or in some social gathering. Still another day, we are engaged in thinking out some problem; and on a fourth day, we are largely given up to remembering or to the play of imagination. The first and the second characteristic experiences agree in that they are both forms of "feeling"; but they are diametrically opposed in that one is painful and the other pleasurable. The third and fourth experiences are unlike either of these forms of feeling and yet agree in being intellectual activities. As intellectual activities, however, they have markedly different characteristics. Since, then, all so-called "elements," or "factors," are the modes of the functioning of one Subject, what more natural than that the various principal modes of its functioning should be spoken of as the "capacities," "faculties," or "powers" of this one Subject? The language of common life, in which we always find the embodiment of genuine psychological truth, indicates the necessity for doing this.

The Mind a Unity. — That some sort of unifying must be admitted for every "stream of consciousness" which comes to be called a "Self," the popular voice and the science of psychology agree in asserting. As to the nature of this unity, the philosophy of mind finds one of its most interesting problems. The science we pursue, however, notes these two truths as facts underlying the empirical unifying of mental processes: —

1. *Every psychic fact is actually complex with an irreducible threefold complexity; it is, at the same time, a fact of intellection, a fact of feeling, and a fact of conation.*

2. *All the more elaborate mental processes, and the different so-called faculties, must be considered as resulting from the development of mental life by the combination and elaboration of the elementary psychical activities.*

Psychology and Other Studies. — What has already been said as to the nature of psychological science, its sources and its methods, must serve to suggest its relations to the other particular sciences. To all the sciences of man it is introductory, fundamental, indispensable. With all the biological sciences its connections are most intimate and mutually helpful. With the other forms of science its relations are more remote. But with what is called "Philosophy" its relations are so intimate that one of the greatest of modern psychologists (Wundt) has justly declared: "The partition of sovereignty between the two is an abstract scheme, which, in the presence of actuality, always appears unsatisfactory."

We conclude, then, from this introductory survey of our field: —

1. Psychology is a science, because the processes and development of man's mental life admit of accurate description and of a certain amount of explanation, by discovery of the conditions under which they arise and of the laws that regulate their occurrence.

2. The method of this science is, like that of every other science, complex, and is to be learned only by a growing experience. It is peculiar, however, in that every special method employed must be accompanied by intro-

spection and followed by reflection upon the significance of the facts in their relation to the one Subject of them all (the Mind).

3. The important connections of psychology with other sciences are almost universal; but they are especially intimate with the biological sciences, and above all with the sciences of man. Psychology is also the one indispensable propædeutic, or introduction, to those more ultimate problems of human reflection which concern the discipline called "Philosophy."

[On the Nature of Psychology, see Sully: The Human Mind, I, chap. i; Baldwin: Handbook of Psychology, I, chap. i. On psychology as a so-called "Natural Science," see James: The Principles of Psychology, I, chap. i, vi, vii, and *passim* in both vols. On Method in Psychology, consult also J. S. Mill: Logic, bk. VI, chap. iv, and Rabier, Leçons de Philosophie, I, La Psychologie, chap. iv. On Experiment in Psychology, see Scripture: The New Psychology (throughout). As studied from the comparative point of view, Wundt's Lectures on Human and Animal Psychology (translation by J. E. Creighton and E. B. Titchener) is especially to be recommended.]

PART FIRST

THE PROCESSES OF MENTAL LIFE

CHAPTER II

CONSCIOUSNESS AND ELEMENTARY SELF-CONSCIOUSNESS

Meaning of the Term "Consciousness." — Obviously the psychologist is in need of some term that will apply to all the phenomena alike, out of which he proposes to construct his science. This term we took the liberty of supplying when these phenomena were, in the definition, said to be "phenomena *of consciousness*," or conscious states and processes. In the same connection the admission was is *no* mental or psychical event. Total unconsciousness is the complete absence of all psychoses. Now by the study of conscious processes, *as such*, but especially by investigation of their conditions and constituents, it may be possible to establish the theory that the mind is capable of other activities than those which manifest themselves "in consciousness." But such theory can never divest itself of the necessity of using terms of conscious experience. Wherever we can discern or infer *conscious* states and processes, there we have phenomena upon which psychological science may throw its lights. But for psychology the unconscious is the denial of the truly psychical or mental.

Conscious States. — What is meant by *a* conscious state or process may now be made somewhat clearer. In the flowing life of the mind no fixed parts can be marked off, as is the case with objects extended, or with changes occurring, in space. Nor does the mental life so flow in time that its moments can be separated by cross-lines, as it were, between which the separate states or processes are located. Abrupt changes in the character of these states do, indeed, not infrequently occur. We are certainly in a quite different "state of mind," when just stung by the bee lurking in the flower, from that in which we were a moment before while admiring the flower's beauty.

In general, however, it is obvious that one's mental life has considerable continuity and smoothness of flow. When "deep" in thought, as it is so expressively said, it takes time and a strong pull to get us up and out of our thoughts into some form of bodily action. When "suffering under" a strong emotion, we usually have to get gradually over into a condition of predominating thoughtfulness or of deliberate choice.

Continuity of Mental States. — It is probable, if not absolutely certain, that there is never a complete break between two successive processes or conditions of the mental life. At each moment, that is, the complex of consciousness includes within itself the lingering phases or "reverberations" of the just previous conscious state. And the present complex, in turn, holds anticipations of, germinal contributions to, the coming conscious state. This principle of continuity which connects the different moments of the conscious life may be illustrated in several ways. What goes on in the field of a slowly revolving kaleidoscope affords an illustration. Or let the series of so-called "states" be represented by A, B, C, D, $\cdots$, N; then, since $A=(a, b, c, d, e,$ etc.), $B=(c, d, e, f, g,$ etc.), $C=(e, f, g, h, i,$ etc.), and $D=(g, h, i, j, k,$ etc.), the change of conscious states may be represented by a flow of (a, b, c, d, e, etc.) into (c, d, e, f, g, etc.), into (e, f, g, h, i, etc.), and so on. Or, perhaps better still, the same truth might be illustrated by the way the successive areas enclosed within the line drawn by a point on the disk of a wheel, that enlarges and contracts as it moves forward with a varying rate of speed, would include portions of each other. To take a concrete instance: a picture of a star-fish is seen; a visual image of dried star-fish is aroused; this seems to be placed in a box; and a memory of a particular star-fish actually seen some ten years ago follows, etc.

Discriminating Activity applied in Conscious States. — So far as can be discovered, human consciousness is never merely a passive area for the reception of impressions. The simplest forms of conscious life are mental activities, as well as modifications of that life by conditions outside of it. And the so-called "states" or "processes" of mind do not separate themselves, as atoms leave their old relations and enter into new relations with other atoms for which they have the greater affinity. As *conscious* states or processes, they must be separated, and recognized as apart, by mental activity. This primary "discriminating consciousness" is the prerequisite of all distinguishable elements or states of consciousness. A pain that were not recognized as a conscious pain would not be a pain at all, in the psychological meaning of the word. It could not be a psychosis, it could only be a physiological condition of a psychosis to be expected. On the other hand, *consciousness*, so far as it can be made the object of psychological investigation, *is synonymous with psychical state, regarded as discriminated, however faintly, in respect of content, and related, however imperfectly, to the stream of mental life.*

At this point the following quotation (Philosophy of Mind, p. 85 f.) emphasizes a matter of the utmost importance to the science of psychology: "It is a most important fallacy in much of the current psychology to assume that the whole of any mental phenomenon is described and explained when the mere '*content*' of consciousness has been described and explained. . . . Of course, no psychosis can be scientifically treated in neglect of its description and explanation, content-wise. For a psychosis without content is equivalent to no psychosis at all." But another aspect, a different "potency," equally belongs to all the phenomena of consciousness. "*For all consciousness, and every phenomenon of consciousness, makes the demand to be considered as a form of functioning, and not as mere differentiation of content.* Phenomena of consciousness are always conscious activities, as truly as they are contents of consciousness. Consciousness is itself consciousness of activity — fundamentally so; and it is so all the way through from the lowest to the highest and most developed forms of functioning."

Whatever unity any complex mental state possesses must be imparted to it, so to speak, by so much of discriminating consciousness as is in it. This will appear more clearly when the nature of attention and discrimination, as mental activities, has been discussed. It is sufficient now to note that without these activities being admitted, the very term "states of consciousness" has no intelligible meaning. Admitting the presence of such activities, we arrive at the following conception of "a

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the following: (1) Some so-called co
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thoughts, feelings, and of striving and
into them, like a given area of a thickl
field of grain. (2) Some conscious st
more time than do others,—this time b
the "*grasp*" of discriminating activity t
referred to as necessary to effect the
conscious states must have. The amo
brought under the surveyor's eye is not
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prominent characteristics with varying *de*
as the fields lying beside the railway c
speed of the train is increased or slac
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"field," in its most figurative use for th
purpose, implies that something correspo
veyor's eye seems everywhere to be imp
fact which leads some students of the
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have used the word as an "inner witness" or "inner light" (Cousin and Hickok). Sir William Hamilton employed it as a collective term for the cognitive aspect, or factors, of psychical states. On the other hand, many German writers, and modern psychologists generally, argue against identifying consciousness and self-consciousness. They deny that we must believe every psychic fact to have all this mechanism concealed in its interior. They ask for the evidence of this universal *double entendre*, or twofoldness of all our conscious states. In some cases, however, this lively protest against the old-fashioned view of the presence of self-consciousness in all consciousness — even that which has reference to external things — is apt to be followed by admissions which, in a measure, refute the other extreme position. Not infrequently these admissions come to this: "Consciousness is the condition in which we not only have the content of the idea in the soul, but also *perceive* or remark the same" (Fortlage). The truth seems to be that, although consciousness may properly be identified with all psychic facts as mere occurrences, psychic facts cannot be known as such, without involving at least inchoate and confused self-consciousness. The beginning of self-consciousness is consciousness considered no longer as *bare* psychic fact, but as discriminating its own state and relating this particular state to others in the stream of conscious life.

Physical Conditions of Consciousness. — Biology and human physiology and hygiene have recently thrown much light upon those conditions of the body, and especially of the brain, which determine the occurrence and nature of conscious processes. These conditions are, in general, the integrity of the nervous system, with its threefold arrangement of end-organs, connecting nerve-tracts, and central organs. Among the central organs, it is the brain on whose functions the conscious life of man is chiefly and directly dependent. The brain-centres must be supplied with properly oxygenized arterial blood. If circulation of such blood is stopped, consciousness ceases. If it is corrupted with drugs or products of diseased tissue, the characteristics of the conscious states are profoundly modified.[1]

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[1] For a fuller discussion of such topics, see the author's Elements of Physiological Psychology, and Outlines of Physiological Psychology.

Moreover, all consciousness apparently involves a cerain heightening of molecular activity in the brain-cenres. Thus there is reason to apply the general biological aw to the physical conditions of our conscious processes. *All activity of tissue is conditioned upon its being decomosed and then regenerated by nourishment. Intensity of onsciousness depends upon intensity of neural function; he latter depends upon intensity of the work of decomposiion, and is inversely as the ease and rapidity with which he inner work of one nerve-element is transmitted to another.*

The sensitiveness of the nervous mass to the most delicate external timuli is almost incredible. The sensitiveness of the mind's reacions in consciousness to the agitations of the mass by these stimuli is lso marvellous. Thus Haller noticed that the noise of beating a rum increased the flow of blood from an open vein; and Mosso bserved that the approach of a lamp toward a patient whose brain was exposed increased the volume of the brain-substance. M. Payot laims to have seen the respiratory rhythm and pulse-rate of a sleepng infant changed by the passage of a cloud over the sun; and M. Féré found that even slight sensations of sound and smell affect man's dynamometric force. How amazingly delicate are some of

In developed mental life every conscious state must be regarded as resulting from an immense number of factors that form a sort of organic unity.

It has already been urged that, when we speak of mental *factors* or *elements* as existing in "a sort of organic unity," we must not understand these words in such manner as to mislead our conception of the real nature of every conscious state. As Professor James has said: "Whatever things are thought in relation are thought from the outset in a unity, in a single pulse of subjectivity, a single psychosis, feeling, or state of mind." But the other side of the truth has been well expressed by M. Paulhan: "Every psychic fact is a system — a synthesis of facts more or less perfectly coördinated."

Putting both truths together, we may assert, on the basis of every man's experience, what psychological science illustrates and demonstrates; namely, that different so-called "fields of consciousness" differ in respect of (1) circuit or extent, (2) intensity, (3) time-rate, (4) specific, complex quality.

Extent or Circuit of Consciousness. — The old-fashioned psychology agreed with Mr. Spencer's equally *a priori* and unwarrantable conclusion, in thinking that only *one* object can be present in consciousness at the same time. Experiment shows that this restriction of the *grasp* of consciousness as a discriminating activity is incorrect. The time-moment of consciousness is not like a mathematical point; it always includes a survey of a *field* of more or less circuit or extent.

Different sensory impressions, under a variety of changing circumstances, may be "grasped together" in consciousness with a clear discernment of their existence as different in the same field. With the most favorable interval (0.2–0.3 sec.), one experimenter found the maximum even number of successive impressions of sound tactual impressions, occurri could be more or less imperfectly local consciousness; but, in most cases, the number either "fused" with one anothe out of consciousness.

Different persons differ widely, as e believes, in their mental grasp. We Copperfield wandered about London stre grief, and yet noticing the minute detai objects. Frederick the Great boasted he died with the "eye of consciousness" of a scientific observer, upon all the phe Any theory which reduces the differe grasp, between Aristotle and Peter vo the stupid soldier who could never recall than two of the three constituents of difference in time-rate of conscious pro absurd.

Intensity of Consciousness. — Different fie ness differ, in some recognizable way, i *psychic energy* which characterize them. in one minute, at certain times, than in ordinary daily experience. This diff a resulting tabulation along that scale of the successive fields. As has already been indicated, *the life of consciousness undergoes rhythmic changes in intensity.* This truth will be further illustrated when we come to treat of attention and of its variations.

Time-rate of Consciousness. — The *speed* of mental processes varies, within given limits, in dependence upon a variety of conditions. This is true as respects both the rate at which the individual conscious states form themselves, and also the rate at which they succeed each other in the stream of consciousness. In the first place, — *a certain amount of objective time is required to form any field of consciousness,* — "*to come to consciousness*" at all, as we are accustomed to say. This is true of sensation, perception, memory, association, choice, or whatever may be the predominating characteristics of the particular field. And there is probably a particular time for every individual which is most favorable for the formation of all elaborate and clearly discriminated conscious states.

The time required for the perfection of mental processes increases, in general, as the degree and amount of discrimination and choice entering into them are increased. To explain, suppose that we divide different mental processes as follows: (1) merely having sensations with a *minimum* of discrimination as to what the "significance" of the sensations is; (2) perceiving things as having such or such characteristics, — a higher degree of discriminating consciousness (sometimes called "apperception"); (3) more or less deliberate choice as to the direction of attention, or as to what we will do with the things apperceived. Then we may say: Perception requires more time than merely having sensations, and, among perceptions, those which have in them most of apperception; but if choice is required as a part of the mental process, then yet more time must be allowed.

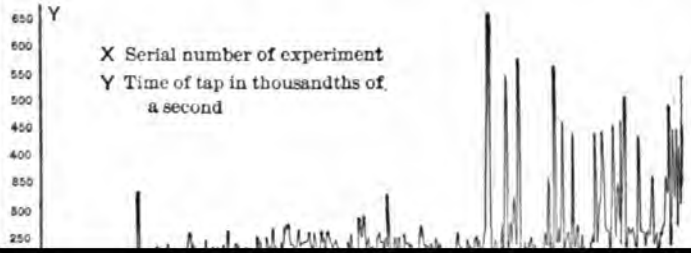
illustrated by the experiments of Ba if a disk with letters on it be displayed, and then q a white disk, when the interval between the two is and elsewhere, signifies 0.001 sec.), the first disk is s weak glimmer. At 9.6 σ interval, letters appear in or two of which can be partially recognized at 14. can be well recognized at 33.6 σ; and six letters at 5

The stream of consciousness, the successio states which make up the life of consciousne varying degrees of rapidity. "Fast living meaning figure of speech as applied here. "S is a slang phrase, but not inappropriately u minds. Three truths should be borne in subject: (1) The speed in development and i belonging to different series of mental states for different classes of states. This has a sufficiently illustrated. (2) In general, the consciousness depends upon a large number calculable factors; yet it has its maximum a mum. (3) Different persons, under similar ci show different time-rates for the movement scious life. They are "fast," "moderate," but no one can exceed certain limits of the hu

The simplest kind of

Quality of Consciousness. — It has already been claimed that all the fundamental "faculties" are employed in every complex mental process. It has even been claimed that "every psychic fact is a system." To quote Dr. Ward: "The most elementary facts of mind cannot be expressed in less than three propositions: I feel somehow, I know something, I do something." We cannot remember or think without both feeling and willing. Yet just as plainly the different fields of consciousness differ widely in their characteristics. This difference is emphasized in the language used by all men to describe their experience, and to express the changing relations in which they figuratively regard themselves (the *Ego*, the Self) as standing to the differing experiences. Thus they speak of themselves as "buried in reverie," "lost in" painful or sweet memories, "plunged in" thought, "carried away" with appetite, "swept by" storms of passion, "driven by" impulse, or as "exercising control over" their own emotions and practical lives. How wide the difference, for example, between the sensuous and the repentant moods of the Magdalene, between the philosopher reflecting over the mysteries of ultimate Being and the philosopher enjoying his dinner, between Alexander drunk and Alexander sober. How immense the range of characteristic qualities between the conscious states of the most gifted and the most stupid, or between the purest saints and the most wretched sinners.

Relations of Extent, Intensity, and Time-rate. — Intimate and varied interrelations exist between the different prominent characteristics of the changing conscious states. Especially is this true of the circuit, the energy, and the speed of consciousness. In all expenditure of psychic energy, the time-rate, the intensity, and the number of objects over which the aggregate of disposable attention is distributed, are, indeed, so interdependent that they may be conceived of as functions of the one mind and capable of statement in something like the terms of a mathematical formula. Intense thought, or feeling, or action requires time; clear discernment bears some proportion both to the complexity of the object submitted for mental analysis and to the time allowed for that analysis. *Some* attention can be given to several objects in the one field of consciousness; but "absorbing" attention can be given only to one central object (the object in the "clear-spot" of the mind's field of vision), and this for only a brief time. So with the psychic energy involved in conscious movements.



Scripture (The New Psychology, p. 229): "When the paralysis occurs the grip does not sink to zero, but remains at a medium point. During the whole experiment I conscientiously gripped as hard as possible.... At the points of paralysis I could not even *will* the grip. I felt a complete mental paralysis and did not suppose that I had gripped at all. On the other hand, I did not suppose that I had relaxed the grip. A kind of mental daze came over me at the points of paralysis." Similar conditions probably occurred in the ergograph experiments of Mosso and Lombard, although they were not observed and recorded.

Elementary Self-consciousness. — We cannot speak of developed self-consciousness except as the result of the development of all the powers of the mind. For the infant there is no "self," and there are no "things," in the meanings which both self and things have for the adult consciousness. Neither can we admit any so-called faculty of self-consciousness as a special work of the mind in forming the conception of self, or in attaining the higher degrees of self-knowledge. It is the same mind, using its same growing powers of discrimination, which comes to distinguish things and self, and to acquire, by comparison and contrast, its mental images and its conceptions both of its self and of other selves and of things.

Our views can be made clearer only as the subjects of attention and discrimination are discussed, and as the facts and laws of that mental development which ends in the knowledge of Self and the knowledge of Things are traced. Obviously, however, consciousness and self-consciousness are not the same. When I am looking intently through a microscope, or watching some absorbing spectacle, or hearing interesting music, I am highly conscious — all alive mentally, so to speak. But I am little, or not at all self-conscious. Neither can it be claimed that the tracing of every conscious state, as such, involves the explicit, or clearly conscious reference of that state to the *Ego* or Self. Certainly, there is in the beginning of the child's mental life no mental picture of a Self, and no already formed distinction between Self and things. This distinction itself is established, this picture formed, as the result of development.

Two things must, however, be admitted to be true of even the most rude and inchoate mental life of every human being: (1) A certain emotional tinge of the most obtrusive experiences, a coloring from *self-feeling*, so to say, belongs to the simplest beginning of conscious states. (2) The stream of consciousness cannot be broken up into states, in any such way as to become either the subject of psychological investigation or representable in adult consciousness, without the "discriminating consciousness" of the subject of these states being active. Attention, discrimination, self-feeling — these seem to belong to all conscious mental life.

While we must postpone the fuller account of self-consciousness until later on, enough has already been said to emphasize these important truths: —

First, That "stream of consciousness," which is but the life of the mind beginning and growing in its own unique way, is the one source from which we must draw our account of all the different conscious processes and of the devolopment of all the so-called mental faculties. To be conscious is to have psychic life. In the germinal psychic life all the elementary forms of psychic functioning are involved, such as attention, discrimination, sensation, feeling, conation, ideation. The growth of this life

Finally, out of this beginning life of feeling and discrimination, as it were, and not as something foreign to the earlier and simpler conscious states, the most elementary self-consciousness emerges. It is accompanied, however, from the first by the growth of perceptive consciousness of things. To trace this complex development is to follow, in a historical way, the development of the mind. But it requires a further preliminary analysis to describe and explain the other particular kinds of elementary conscious processes.

[Compare Professor James' chapter on "The Stream of Thought": The Principles of Psychology, I, ix; and Sully: The Human Mind, I, p. 72 f. Further special investigators would profit by reading the monographs, in German, of Ochorowitz (*Bedingungen d. Bewusstwerdens*, 1874); Lipps: Grundthatsachen d. Seelenlebens; and, more recently, of J. C. Fischer, J. L. A. Koch, Schuster, Wahle, and others.]

CHAPTER III

ATTENTION AND DISCRIMINATION

Attention as so-called "Faculty." — Our customary language makes a distinction which all adults readily understand. This distinction may be emphasized by reflecting upon the difference between such words as "hear" and "hearken," "see" and "look," etc. The latter of the two couples of words (namely, "hearken" and "look") are used in command and exhortation; they imply an ability on the part of the mind to control the conscious processes. Hence this ability has sometimes been spoken of by psychologists as a special faculty. And by the so-called "faculty of attention" is then meant *a purposeful volition, suffused with peculiar feelings of effort or strain, and accompanied by a changed condition of the field of consciousness, as respects intensity, content, and clearness.*

under the circumstances. The idle schoolboy is inattentive to his lessons, because he is attentive to objects outside the window, or to memories of past play-time, or to plans for the coming holiday. The foundations of a scientific psychology can be laid only if we admit the conditions and laws of this universal experience: *Primary attention is a form of psychical activity which enters into the determination of the character of every field of consciousness. It is a most general form of all mental life.* In the figurative language of Professor James: "It (the 'stream of thought' = the mind) is always interested more in one part of its object than in another, and welcomes and rejects, or chooses, all the while it thinks."

Physiological Conditions of Attention. — The changes which go on in the nervous centres, in the so-called psychic nerve-cells and nerve-fibres, are very significant in their bearing upon the psychological doctrine of attention. In diseases of the brain, where there is impaired integrity of its substances or an abnormal condition of the blood-supply, the sufferer finds it difficult or impossible to control the stream of consciousness, as sound men ordinarily do. Sometimes so-called "hypertrophy of attention" takes place, and *one* idea, *one* feeling, *one* fancy, persistently usurps the central part of the field of consciousness. It continually forces the attention of the patient upon itself. Or, again, there may be impotency to attend with ordinary fixity to anything. "The current of ideas is so rapid and exuberant that the mind becomes a prey to unbridled automatism." The lower animals which have lost important parts of the brain-areas show the effects of this loss by changes in the power of attention. The "soul-blindness" and "soul-deafness" (or seeing and hearing, but *without interpreting the meaning* of what is seen and heard) of the dog which has lost part of its cerebral substance is partly due to inability to attend to the object of sight or of hearing. Nothing is more distinctive of idiocy or of general paralysis than impotency of attention. These observations show that *attention, or the focusing of psychical energy, involves increased activity in certain brain-centres, — a "focusing" of physiological function.*

Attention, which is itself the indispensable prerequisite and accompaniment of all mental work, implies work being done in the brain. Experiments in reaction-time illustrate this. If the reacting agent is taken "off guard,"— that is, if his attention is not properly focused when the signal is given,— he reacts more slowly and irregularly. If he is warned, and so is found "on guard," he reacts most promptly and regularly. Promptness and regularity in reacting depend upon just the right time (not too little or too much) being allowed for the "focusing" of attention. Thus Wundt found that when one is warned at what instant to expect the sound of a falling ball, the time necessary to discern the sound may be reduced from 253 σ to 76 σ, if the ball falls 25 ctm.; and from 266 σ to 175 σ, if the ball falls 5 ctm. Another observer (Beaunis) attention he gave to Descartes' treatise *De l'Homme.* It "caused such a violent beating of the heart that from hour to hour he was compelled to lay the book aside and break off its perusal."

Nothing can well be of more importance to both student and teacher than to know something of the physiological and psychological laws of attention. Without "giving" attention, successful study is impossible. Without "securing" attention, successful teaching is equally impossible.

Variations of Attention. — It is a common experience that attention cannot long be held concentrated, or "focused," upon one object with a steady strain. Experiment confirms this experience and points out certain measurements for the rise and fall of attention as accompanying all conscious life. This *variable* character marks all kinds and degrees of attention. The rhythmic movement of attention may be illustrated in the following, among many, ways. If a ticking watch be held at such distance from the ear that its sounds can be heard only with a very strict attention, some of the successive ticks will drop out of consciousness altogether. This is not because the objective stimulus varies in intensity, but because the attention we are able to give to the sensation varies. Helmholtz showed that a black radius on a rotating white disk may be made to shorten and lengthen alternately by fixating it with a steady attempt at uniform attention. A gray disk looked at in this way, when lighted with uniform intensity, undergoes changes in its apparent brightness. Ebbinghaus, while experimenting to determine how many "non-sense syllables" could be learned and remembered in series, under different conditions of learning and remembering, discovered periodic oscillations in the mental susceptibility to attend. Thus, in 84 experiments with six sixteen-syllable series, the mean time required for learning was as follows: for the first, 191 sec.; for the

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tion are instances under the general princi
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order to test the disturbance of attention,
first, with a series of simple muscular reactic
to a stimulus of light; second, with the s
while a weak reflected light flickers across th
third, when the person reacting is further
the image of a revolving card. The average
tion for the three series are,—for the first
for the second, 148 σ; for the third, 139 σ.
however, in these results a number of influe
the distracting sensation are present.

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of "doing a sum," or "reading aloud," etc., u
who is trying to press a tube a certain num
once in so often, and with a uniform pres
distractions produced (1) irregularity of in
motor discharges; (2) diminution or slowe
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be illustrated by the following diagram and its accompanying explanation.

Let the "stream of consciousness," in relation to time, intensity, and extent (see p. 31 f.) be represented by the three dimensions of the solid figure: viz., the time by the length, the intensity by the height, and the extent at any moment by a cross-section (as, for example, at **q**, **r**, **s**, or **t**). Fluctuations in intensity and extent will then be illustrated by variations in the height and breadth of the figure. Thus at **q** is one *maximum* of conscious intensity; at **r** a *minimum;* and then a rapid rise to another maximum at **s**. The extent of the conscious stream, or the number of ideas grasped together at any given moment, varies inversely as the intensity of attention to any one idea or set of ideas. This may be illustrated by the assumed contraction and expansion of the sides of the figure. But if the amount of psychic energy be supposed to remain constant, the areas of the cross-sections remain equal; and then the increase of attention to one group of ideas withdraws attention from the others (the *apex* of the solid rises, and the *base* contracts).

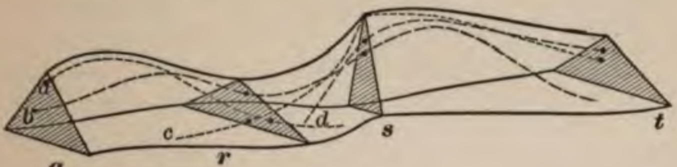

FIG. 2

The rise and fall of ideas in the stream of consciousness under the influence of the redistribution of attention may now be illustrated by the changes in position of the ideas **a**, **b**, **c**, **d**. At one moment (**q**) the idea **a** is raised to the apex by attention, while **b** sinks under relative neglect. But at the next moment (**r**), by having "attracted" attention, **b** has become prominent. And now, just before this same moment (**r**), on account of some internal or external association, **c** enters consciousness, and at another moment (**s**) has become the ruling idea, bringing with it another new idea, **d**, and fusing with **d** and with **b**, so as to absorb almost the entire amount of conscious interest and attention. Now **b** soon drops out, and **c** and **d** enter into new associations.

Relation of Attention to Feeling. — The focusing of attention and its constant redistribution changes the character of conscious states in every fundamental aspect of such states. But the general fact is especially obvious as connected with changes in the emotional aspect, with what we call "our feelings." The power which different objects of sense or different ideas possess to get for themselves attention in that "struggle for existence" which takes place in the stream of consciousness is popularly summed up in one word. That word is "interest." But to be *interested* in any object or idea is mainly to have toward it a certain attitude of feeling. What is interesting excites our feelings; what excites our feelings is attended to as interesting. So true is this that one psychologist (Stumpf) exaggerates the connection between the two and declares: "Attention is identical with interest, and interest is a feeling."

The forms of feeling connoted by the one term "interest," and in this way marked by their close relation to the distribution of attention, are exceedingly diverse. The "horrible," "disgusting," or "repulsive," has for many minds even more fascination than the "pleasant."

ever point of view looked at, these and similar psychoses illustrate the relation of attention to all those forms of feeling which are described by the general term *interest.*

More particularly, the distribution of attention among the objects and ideas in any field of consciousness is dependent upon variations in feeling as respects, (1) novelty, (2) intensity, (3) tone of pleasure or pain, and (4) freshness or exhaustion. All feelings are in themselves interesting; and the most loathsome and unbearable of all emotional conditions is that dull monotone into which no changes of feeling break. Other things being equal, the novel sensation, or idea, or proposal, is easiest attended to, because most interesting. Indeed, the interest of *novelty* is often supreme in the control of the distribution of attention. *Intensity* of feeling, within certain limits, compels attention. But when the disturbance of emotional consciousness reaches a certain height, — as when storms of anger, grief, or terror possess the mind, — attention may become lowered to the blindly-groping animal type. The *tone* of pleasure or pain influences the attention in its distribution, within the field of consciousness. Objects or ideas that excite either pleasurable or painful feeling attract our attention away from those that have a more neutral tone. On the other hand, for the self-controlled adult the voluntary yielding or withdrawing of attention increases or diminishes the amount of pleasurable or painful feeling. We tell even small children, not to "*mind*" their bruises and they will not *feel* them. The philosopher Kant trained himself not to pay attention to the pain in his chest, although whenever he allowed himself to think of it, he found it always there. Hypnotic subjects feel only the pains which it is suggested they shall feel. Here the distribution of attention under the control of the experimenter either submerges or emphasizes the tone of feeling belonging to the different perceptions and ideas. "*Freshness*" and "*exhaustion*" are popular terms which describe how the repeated focusing of attention may stand related to emotional excitements. These characteristics of our feeling are intimately connected with the changes in interest and attention which novelty and intensity control.

Relation of Attention to Willing. — The inattentive mind is habitually the unwilling mind, — toward the same objects, ideas, or plans. And, indeed, attention seems to imply, even in its lowest form, a certain amount and kind of willing. From the most fundamental point of view, wholly neglect this consciousness. It is still *my* atten impulse; *I* submit to the force. W Foster speaks of an amœba as having he probably does not mean to indica logical by his words. But the rese others into the "psychic life of micro- that something similar to primary atte function of will, may take place even rate, in man's case, the truth is clear: *its higher stages of growth, may reach t sary to intelligent, purposeful choice, is striving and selective, but self-originatin lower forms of man's conscious life.*

Relation of Attention to Sensations an effect of attention upon the discrimina powers of the mind is most immediate waking life there are scores of obscu lurking at the threshold of consciousn definitely localized and made relative pressive, if we will only attend to the attend to the "feelings" in the differen body. Such a voluntary survey of

Attention not only intensifies sensations; it actually creates them. Experiment has shown that most persons who are attentively expecting, for example, a wire to be heated, or a glass bead to appear at a certain distance, feel and see what they attentively expect, even when the objective stimulus is wanting.

Repeated acts of attention directed upon the same sensory objects heighten the effects of discrimination in enlarging and "clarifying" the contents of the field of consciousness. If a disk with differently colored spots or different letters on its surface be displayed for a brief time, the most fixed attention will at first enable only from three to six of these objects to be discerned. By repeatedly attending to this field, a larger number of objects will be *seen* (not simply remembered) after the display of the disk for the same length of time.

We thus reach a partial explanation of what is called "attention as adjustment," or "expectant attention." In truth, every more clearly discriminating act of attending implies some attentive discrimination already exercised upon the same object. To state the fact as a paradox: No special attention without previous attention. Thus we see best what the bodily and mental mechanism is already best *adjusted* to see, what we *expect* to see. And the case is the same with hearing and with our other senses. Moreover, the training of every mind determines largely the particular features of any object to which attention shall be given; as well as the speed and accuracy of the resulting discriminations. The Greek scholar who is accustomed to dwell upon the minutiæ of words detects the missing or wrong accent. The man interested in wood-craft notes the flight and the peculiar feathering of the birds, the mottling of the bark, the chirping of the insects — things unseen and unheard by other eyes and ears. As Professor Münsterberg has pointed out: The clear mental representation in consciousness of **a** is preceded by another condition of consciousness which, according to its content, contains the less clear mental representation of **a**. It is as though in every field of consciousness a great variety of sensations and ideas were possible claimants for the available psychic energy; a sort of preliminary survey enables us to select such of them as best suit our tastes, or our present purpose, and upon *these* we bestow the preference in the further distribution of that energy.

In brief: *I attend in some degree to every content of consciousness, and I have the better grasp of consciousness upon every content to which I give much attention. Only if this be so, can I learn to select within limits that to which I will particularly attend, and really grasp mentally that to which I choose to attend.* Sully is in the right when he responds to Stumpf's claim that it is improper to speak of one "attending" to a box on the ear: "One would like to know the fortunate man who could receive a box on the ear, and *not* attend to it." What, indeed, should we say to such a man the better to express his mental peculiarity than this: "You do not seem to *mind* such trifles much."

Attention as Fundamental in Intellectual Life. — We are now prepared for a clearer notion of the beginnings of a truly *intellectual* development. For centuries it has been held that "analysis" and "synthesis" are necessary to the evolution of human intelligence. We now see that all attention, considered as variously distributed degrees of discriminating consciousness, implies this fundamental process of analysis. *Attention is a process of selective focusing of psychic energy.* This is the primary condition of *all* intelligence. "Human" intelligence is characterized by the relatively unlimited character of the development of this process, as well as by the great variety and range of objects upon which it can be directed, on account of the infinitely richer experience of man as compared with the lower animals.

Kinds of Attention. — Two kinds of attention may be recognized: (1) forced attention and (2) voluntary attention. In the earlier movements of discriminating consciousness its direction and distribution are not *voluntary*, in the fuller meaning of this word. The rather does the discrimination seem "solicited," "impelled," or "forced." In the later and more highly finished processes of the mental life, there is much attention which continues to bear the same character; *it* — the object — controls our discriminating and selective consciousness rather than *we* control ourselves. The further discussion of this difference requires that it should be preceded by some examination of the conative aspect of mental life.

The neglect to recognize the universal and elementary character of attention, and imperfections in the dependent doctrine of discriminating consciousness (or "primary intellection") have led many psychologists into serious errors. The psychologists of the English empiricist School, such as Locke, Hume, Hartley, the Mills, and even Herbert Spencer, have, in general, almost entirely neglected these patent phenomena of all conscious life; they have, therefore, almost wholly misconceived the nature and the explanation of human, and even of animal intelligence. Their successors in this country to-day are suffering much from the same narrowness. According to Professor James, the failure to notice "so patent a fact as the perpetual presence of selective attention" is due to the unwillingness to attempt a problem whose solution would so obviously interfere with "the smoothness of their tale." However this may be, any psychological theory, and even any descriptive history of mental development, which lays all the emphasis on sensations and ideas as content of a passive consciousness, and which overlooks the all-pervasive and dominant fact of an active and discriminating and selective psychic energy, is doomed to failure. (Comp. p. 22 f.) The impressive thing about the mental life of man, the thing that carries with it the seductions of mystery and sounds the inspiring call to renewed effort at *research*, is just this marvellous psychic energy. "Receiving impressions" to all eternity would never result in developing what we call "Mind." The active response, the forthputting of the mind's own powers according to its own constitution, is the prominent and the really impressive thing for the psychologist.

Of the English psychologists, Ward and Sully have been among the first clearly to recognize the true psychological import of attention. They have been followed by Mr. Stout, who devotes most of his two volumes on "Analytic Psychology" to the speculative treatment of this problem. Ward holds that "the relation of presentation itself implies what, for want of a better word, may be called *attention*, extending the denotation of this term so as to include

used, in a variety of connections, the ter
consciousness." Regarded as an activit
procedure accomplishes the elaboration
the organization of all mental processe
development of the whole life of the min
of a "state of consciousness" or "circ
ness" is absurd, if the influence of suc
activity is excluded.

But we have just seen that the doctrin
and distributing of attention is inseparabl
the same fundamental experiences. Tl
attention, the concentration of attentio
influence of attention, furnish topics w
investigated without constant considerati
activity in discrimination. Indeed, the v
consciousness enforces the same set of
sciousness regarded as objectively discrimin
ing a certain concrete content, and conscious
discriminating activity, are only two sides,
and the same consciousness. In other wor
in" a certain conscious state of impres
object or idea — and to be "doing someth

Physiological Conditions of Primary Intellection. — The lowest order of dawning intelligence implies the bringing of two or more sensations, feelings, or ideas, into the unity of consciousness and the dealing with them there, as it were, according to relations of similarity or difference consciously discerned. Although we are ignorant of those precise conditions of the brain-centres which are involved in this complex mental activity, we are justified in holding some such general view as follows: To the complexity and elaborateness of the processes involved on the psychical side some correspondingly complex and elaborate brain-processes stand related. ✗

The human brain is a kind of physical unity, and yet it has a great variety of different "centres" so-called, which bear special relations to the different primary processes of consciousness. These centres are united by "association-tracts"; and the impeding or destroying of these tracts has an important influence over the collective or allied functions of the centres themselves. Thus the animal which has suffered injury of its visual centres, or of the nerve-tracts associating them, may still be capable of visual sensations; but the *intellectual* quality of the sensations, as dependent upon active discrimination and psychical association, is relatively lost. Hence the soul-blindness to which reference has already (p. 37 f.) been made. In certain forms of aphasia, too, the human patient may be able to hear all manner of sounds, but the sounds lack their former sense (or intellectual quality) and can no longer be heard as *words*, in the fuller meaning of the term.

The complexity of the physiological processes which accompany even the more primary intellectual activities, and the necessity that these processes should spread over the appropriate centres, by way of the "association-tracts," is illustrated in another manner. We have already seen that attention, with discrimination, requires prolonged scarcely desirable in this place remark upon the truth which all psych namely, that, while the psychical activit upon the completion of certain physiol they cannot themselves be regarded as ot *psychical activities.*

Consciousness of Resemblance. — A fur that complex activity called attentive an consciousness shows that it has several possible aspects. Of these, one of the and fundamental may be described as "c resemblance." An examination of exper psychologist's point of view, shows tha *awareness of resemblance is a primary and of intellection, which is necessary for the be all the development of a truly mental life.*

Resembling Consciousnesses not Consciousnes — That form of psychological theory whi sciousness only "content-wise," and assu how sensations and ideas organize thems important mistake at this point. It c sembling conscious states with the stat scious of a resemblance. But the c resembles that called up by yonder sunset cloud. And each tick of the clock to which I am listening resembles the other ticks of the same clock. The immediately successive ticks may differ, as they seem to me to sound (perhaps depending partly, as we have already seen, on the rhythm of attention — tick-*tack*, tick-*tack*, etc., rather than the monotonous, tick, tick, tick). But in all these experiences, and in all other similar experiences, when we have noted that the sensations *are* different, we have not explained how they come to *seem* different. In psychology, the "seeming" of sensations is their real "being." A "noticing" or "becoming aware of" the likeness is necessary to the existence in consciousness of the likeness. And this *noticing*, as a consciousness, is not accounted for by the fact or the theory of an objective or non-conscious likeness.

In general, *consciousnesses that resemble each other cannot — simply by being brought into juxtaposition or being compounded — account for the consciousness of resemblance.*

Consciousness of Difference. — Psychologists have debated much over the priority of these two allied forms of primary intellection, — the consciousness of resemblance and the consciousness of difference. A great amount of ingenuity has been exercised in trying to describe the character of the earliest known object (*primum cognitum*). From our adult point of view we cannot even imagine any knowledge without both kinds of discrimination taking place. Both the immediate awareness of resemblance, and the almost or quite equally immediate awareness of difference, seem necessary in order to start all our intellectual development. And, as we shall see later, the primary forms of analysis and synthesis are involved from the first. At the same time, as regards theoretical priority, the consciousness of resemblance and the consciousness of difference do not appear to stand in precisely the same relations to the very

prolonged attentio
external objects and in ideas. Mistak
lation of objects that are really unlik
experiences which follow such mista
attend more carefully and to discrimi
ests of our practical ends, the import
things. Science is interested in discov
and minuter, but often more enduring,

Growth of Primary Intellection. — The
cesses of the infant are undoubtedly very
and fitful. In its night, or rather its ea
are alike, for all are gray. The more int
ties of the objects of its attention — at
chiefly allured or forced by the working
physical mechanism — are noted "in the l
and more than half in a blind, instinctive
consciousness of *similarity*, without an
similar-in-what-respect, may well describe
of discrimination. Such a conscious st
spoken of as a "feeling of likeness," ra
discrimination of likenesses. Even in
have frequent experiences which help u
beginnings of intellectual life. We wak
from

of the consciousness of resemblance nothing is more effective than a rhythmic repetition of pleasant sensations. Here everything is favorable to stirring the consciousness of the infant to an act of simple discernment and to a recognition of resemblance. The nurse croons over it, rocking it in her arms; the bright toy or the lighted candle moves to and fro before its eyes; or it is patted or stroked to soothe it. Again and yet again the *same* sweet experience is noted in the stream of conscious states. How can the sensitive soul of the child fail to be allured into an improvement of the opportunity to grasp the simple but important fact, that A, A_1, A_2, A_3, etc., although succeeding in time, are similar states of consciousness as respects the content of sensation, the tone of feeling evoked, and the motor activities engaged?

On the contrary, it is customarily some abrupt change in the content of the stream of consciousness, and some accompanying shock of painful feeling, which stimulates the consciousness of difference. The cup of milk which is not warmed or sweetened to the customary standard forces the mind to discern *wherein* it does *not* suit, as its predecessors have, the infant's taste. The shock of disappointment, the inhibition of the smooth recurring of the psychic mechanism, the reversal of what appears entitled to be felt as customary and according to law, are educators in the distinguishing of differences. Life and comfort depend upon making distinctions; this is true of every species of animals. The sharpening of intellect comes, in man's case, by way of learning that things *are not* what they at first *seem to be*. A hasty identification on the basis of obtrusive similarities costs us the loss of many a success which might otherwise have been obtained.

Varying Amounts of Intellection.—It is customary to measure intellectual processes and attainments as though they were quantities which could be brought into com-

through some standard. Thus, men speak of
" and "small" intellects, of "strong" and "feeble"
s of thought, of "contracted" and "capacious"
We admire others when we see them doing with
ss, ease, and precision things which we can do only
painfully, and imperfectly, if at all. We incline
bute to such men superior *mental* attainments, and
se ourselves of being deficient in *intellectual* gifts.
may be, however, a fundamental fallacy in this.
ere are not a few performances which *simulate* a
gree of genuinely intellectual development but do
lly involve any genuine intellectual processes at
he purposeful action of a natural mechanism, like
nal cord of a decapitated frog or the apparatus for
ng the seed of some plants, may seem to be a very
ent affair. The lower animals, generally, behave
e respects as though they were the intellectual
rs of Aristotle or Kant. In some other respects

18 small ones. Preyer has shown that one can train one's self to discriminate accurately up to 20 or even 30 objects, when they are exposed far too briefly to admit of being counted. The shrewd crow of which Romanes tells us, who seemed able to discern the difference between five men and six men, neither counted nor performed any other highly intellectual process.

Primary Intellection and the Other Faculties. — The analysis of attentive and discriminating consciousness has shown us how complex and interrelated are all, even the most elementary processes of the truly mental life. If this analysis is carried still further, it will be seen that some kind of memory and of ideating has been implied in what has already been said. For no field of consciousness, or conscious state, is wholly stationary; and sensations, or objects, or thoughts, do not exist or abide in the stream of consciousness, as the elements of some material composite thing remain a part of that thing. Therefore, for the discernment of likeness or unlikeness — and this has been found to be fundamental in intellectual development — some form of *re*presentation is necessary. It will appear that the ability to compare depends upon the ability to recall, to do what has been aptly called "hark back" in the stream of consciousness, and so get a clearer "idea" of what the particular object was. Experiment shows that if we are allowed time to do this, and so "to get an *idea*" of what we just saw or heard or tasted, — our discernment of likenesses and unlikenesses is improved. In picking out blocks, for example, which are of the same weight, or which differ from each other by a fixed amount of difference, we instinctively lift both the weights to be compared and the standard weight again and again. We are thus clearing up and deepening our "ideas" of the things to be compared. But this is an *intellectual* process.

Indeed, *our very power to constitute the different mental factors into the unity of one state, into a system of related* *whether similar or different in quantity, quality, and oring, is dependent upon the influence of ideas.* But ıg this we have brought this subject as far along ussion as is profitable until we have had time to other subjects.

tion may profitably be called again to the mischievous result empt to reduce the entire science of mental life to an account ceiving and association of sensations, and of those revived f sensations called "ideas." The confessed meagreness of ory Mr. Spencer has tried to supplement by speaking of a sort of "feeling" interpolated between the two suggested s or ideas. Thus the whole mental life of man is to be ac-for as a succession of "agglutinated" and "agglomerated" s and ideas, with "feelings of relation" thrown in between

nfluence of feeling as stimulus and guide in the formative the intellectual life cannot be denied. Its important influ-ndeed, evident all the way through, and in every process from highest. But just as little, and even less, can the fact of an scriminating mind be denied, — of a consciousness of resem-nd differences, a selective and preferential exercise of psychic

Both these views are unpsychological. The former, because it contradicts many plain psychic facts; the latter, because it departs in its speculations from the basis of indisputable psychic facts.

[On Attention compare Sully: The Human Mind, I, chap. vi; James: The Principles of Psychology, I, chap. xi; and Külpe: Outlines of Psychology, Part III, §§ 72–76. Among monographs on the subject may be mentioned, Ribot: La Psychologie de l'Attention; G. E. Müller, Zur Theorie d. sinnlichen Aufmerksamkeit; and Dohrn: Das Problem d. Aufmerksamkeit. What has been called in this chapter "Primary Intellection" is a subject far too little treated of in most works on Psychology. Compare, however, James: The Principles of Psychology, I, chap. xii and xiii. Wundt: Logik, I, pt. i, chap. ii; Binet: La Psychologie du Raisonnement; and Preyer: The Development of the Intellect, are also to be recommended for more extended study of the subject.]

CHAPTER IV

SENSATION

tant psychological errors need to be further guarded at this point. In psychology, as has already been d, such terms as "elements" and "factors" of sness, or the "fusion" and "analysis" of factors laboration and development of mental life, are e. They are designed to emphasize the complex of the conscious states and the nature of that in richness and effectiveness which is shown by ng portions of the "stream of consciousness." planation should be borne in mind when these e applied to sensations and to the development at a more complete conception of the nature of sensation. First, every sensation is always a *psychic affair*. Sensations, of every description and degree of intensity, are, for the psychologist, modifications of the stream of consciousness. They neither are, nor are like, any external stimulus or resulting nerve-commotion. They cannot be spoken of as propagated from the skin or the eye to the brain, or as compounded and "elaborated" in the brain. Second, sensations, although they are psychic events, under all normal conditions require the antecedents of a nervous excitement that is *due to external stimuli*. They imply, in respect of their physical antecedents, some action of things upon the peripheral parts of the nervous system (the so-called "end-organs of sense"). Third, although sensations can never be identified by the psychologist with the properties and doings of things, they are those modifications of consciousness, those forms of the reaction of mind to external stimuli, by means of which we gain the cognition of things. To a mind without sensory experience, even if such a mind could be conceived of, there would come no dawning and no developing consciousness of an external world. At the same time, fourth, *mere* sense, if we are to speak in that way, would give no knowledge of things. This will become more apparent as the development of perception is studied. But it follows from the truth that attention and discrimination belong to the very beginnings of our sensory experience; its forms of mental functioning are something more and other than the mere having of sensations.

In a preliminary way, then, we may define *sensation as that peculiar modification of consciousness (or conscious process) which customarily occurs when some organ of sense is excited by external stimuli.* If, however, we look forward and descry the relation which this elementary conscious process sustains to the knowledge of things, we may say:

ns are those peculiar modifications of our conscious- vhich the nature of sensible objects is made known

g can well be more absurd, from the point of view to which logist must remain faithful, than to follow those who, like rnard and Lewes, speak of the contraction of living tissue ntient" process; or who, like Comte and Dr. Maudsley hysiology and psychology, and subordinate the latter to the The same criticism applies with almost equal force to those v Mr. Spencer in describing the origin, fusion, and develop- our sensations, as the aggregation and agglomeration of ervous shocks." But, on the other hand, it can be satis- hown that almost the entire science of so-called "physi- its treatment of the organism of sense-perception, is really gy" and, sometimes, meagre and poor psychology. It should a moment, be forgotten that sensations are phenomena of *ss;* and that they are, as Horwicz says, "no mere passivity, ting impulse." Even to speak of them as "an arousement che" is much nearer the undoubted truth than to speak of erms of nervous shocks. The recognized physiological use d "sensitiveness" to mean the ability of organic tissue to truly nervous elements of the end-organs of sense must be conveyed to the central organs along more or less clearly marked lines of conduction, called *nerve-tracts.* (3) Important modifications of these propagated nerve-commotions (such as may be somewhat vaguely described under such terms as "elaboration," "inhibition," "fusion," "adjustment," "association," etc.) take place when the nerve-commotions reach the peculiar histological structures of the *central organs* (especially the brain) and call out their physiological[1] functions.

In all ordinary cases, it is only when the foregoing physiological conditions have been fulfilled that sensations arise in consciousness. And the quality, quantity, complex character, tone of feeling, time-rate, and changes of the sensations in the stream of consciousness depend upon the way that these physiological conditions are fulfilled.

It should be understood, at least in a preliminary way, that different sensations stand in different relations to the physical organism and to the development of sensation-experience. The tactual and, perhaps, the muscular sensations are fundamental and universal. Biology makes important use of this fact in its account of the evolution of animal species. Some kind of sensitive integument which is responsive to these forms of stimulation belongs to the lower forms of animal life. The human embryo probably begins its sense-experience with tactual and muscular sensations only. In all highly organized animals the outer integument, and the organs of sense it contains, develop from the same embryonic layer ("Epiblast") from which come the central organs of the nervous system.

Kinds of Sensation. — The popular classification into the five senses of smell, taste, hearing, sight, and touch is based upon the more obvious parts of the body, through the excitement of which these kinds of sensation come.

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[1] For further details under this and the following sections, the pupil should consult the author's Elements of Physiological Psychology or his Outlines of Physiological Psychology; or some similar treatise.

no means complete. In any attempt at classifi-
several truths of common experience, as well as
more scientific considerations, need to be kept in
First: all the sensory experiences of our daily life
plex; they result from the combined activity of
organs and may be described as fusions of dif-
imple sensations or kinds of sensations. Second,
erience is not of sensations, "as such"; it is rather
ledge of things through the senses. Third, the
of the less complex sensory processes into which
lysis of the psychologist breaks up this sensory
nce is bewilderingly great. And, fourth: there is,
last, no satisfactory way of classifying sensations
ppeal to experience in connection with the use of
erent organs of sense. The results of science, then,
xtension of the popular classification rather than
ely new classification.

case can we reason deductively from a knowledge cles thrown off from the smellable substance and drawn over the organs in the inspired current of air. This view is suggested by investigations which have gone on since Romieu (1756) discovered that small bits of camphor on the surface of water have a curious rotary motion. Subsequently, several hundred odorous substances have been observed to behave in the same way.

Smells, as sensations, are generally said to be "unclassifiable." Each smellable object has its own peculiar smell; the behavior of dogs and of certain hypnotic subjects leads us to believe that each human body has a characteristic odor due to its peculiar effluvia. Smells cannot be sorted out into classes, as can colors into red, green, blue, and the like. For the same reason, no graphic representation, by use of a line, circle, or triangle, is available for the phenomena of olfactory sensations. The most recent investigations, indeed, point in the direction of our being at some time able to arrange these sensations in a scheme corresponding to the chemical constitutions of the substances exciting them. For example, products relatively poor in hydrogen may form "an aromatic series," etc.

Sensations of Taste. — Somewhat more scientific information is obtainable respecting these sensations than those of smell. The end-organs of taste are certain "gustatory flasks" or "bulbs" contained in the *papillæ* of the tongue and, perhaps, the anterior portions of the soft palate. The question whether tastable substances excite different sensations when applied to different portions of the tongue cannot be easily answered. Many persons seem to taste sweet and sour chiefly with the tip of the tongue, alkaline and bitter with its roots. In general, only fluid bodies, or such as are to some extent soluble, excite sensations of taste. The saliva is the natural solvent for all tastable substances that are solid.

The attempt has been made to classify sensations of

Thus Wundt would add the alkaline and the
c to the four recognized classes of the sweet, the
the salt, and the sour. Much of what is commonly
the "taste" of things is traceable to the olfactory
ons connected with having them in the mouth.
his admission, however, does not make satisfactory
meagre list as comprises only six different tastes.
ots have been made here also to establish a scientific
cation on a basis of chemistry. For example, the
chlorides are said to have a salt taste; but the
have generally an acid taste; and sweet-tasting
ces are alcoholic bodies containing the radical
I. This is chemistry, however, rather than psy-
.

tions of Sound. — Modifications of consciousness
arise when the nerves of the ear are irritated by
c waves (sensations of sound) are of two kinds:
and Tones, or musical sounds. The mechanical

Musical sounds, or tones, are ordinarily complex and result from the fusion of a number of simple sensations in a sensation-complex which the German psychologists call a "clang." Clangs vary in respect of pitch, intensity, and timbre. They are "high" or "low," "loud" or "soft," and they differ as regards that kind of shading which distinguishes, for example, the tone **a**, when sounded on the piano, from the same tone on the violin. The *pitch* of tones depends upon the rapidity of the periodic vibrations which occasion them. Regarded as varying in pitch, they may be arranged in a "scale," and the entire scale may then be symbolized by a line which ascends from a certain indefinite depth to a certain indefinite height, and which has its tones located at distinguishable points between. The way to make a scale of tone-sensations is, given two tones, as m and n, that are separated by a discernible interval, to put a new tone midway between them, say m'. Then between m and m' another tone may be located; and so on until the limit of discernibility is reached. Experiment shows that the ear can discriminate far more nicely than the voice can execute. He would have a poor ear who could not discriminate more nicely than quarter tones; while the most accurate singers would find the greatest difficulty in singing in quarter tones. By the *timbre* of clangs we understand that complex quality which results from mixture of the overtones and the fundamental tone. The facts as to the intensity of acoustic sensations will be discussed in connection with the general theory of sensation magnitudes.

Visual Sensations. — Those modifications of consciousness which arise in response to stimulus of the eyes are of two kinds, Light and Color. The external organ of sight may be briefly described as a water *camera obscura*, with a self-adjusting lens, and a concave, sensitive membrane as a screen on which the image is formed. Light (in the

al meaning of the word) is not, however, the imme-
stimulus of the end-organs of this sense. The truly
us process begins when the rods and cones of the
are excited by photo-chemical changes in the back
of the retina. Sensations of *light* vary, theoreti-
all the way from pure white to pure black, through
cernible shades of gray. These sensations, like all
ions, vary in intensity — from the lowest to the high-
gree of brightness. But sensations of *color* vary in
eculiarity of quality which an inspection of the lines
spectrum enables us to distinguish. Things are
n to have a great variety of the more important
and of minor variations of colors. Using a more
e terminology, we may speak of many "hues," or
, as determined by wave-lengths of the stimulus,
may be darkened to make various "shades" and
ned to make various "tints."

xperiment, either in the rough way of the unscientific painter

Purity of Color. — Sensations of color are said to be "pure," or "saturated," when they are free from admixture with other color-sensations. But none of the hues of our ordinary experience are perfectly pure; for they may be made to appear brighter by looking at them when the eye has already been "fatigued" with the complementary color. This composite character of our color-sensations does not, however, admit of analysis by attentive and discriminating consciousness in precisely the same way as does the composite sound, the so-called "clang." Normal eyes would distinguish between a decidedly *blue*-green and a *yellow*-green; and, if one had never seen orange, but was familiar with yellow and red, one might possibly regard the former as a mixture of the latter two. Probably the analysis of "seal-brown" into black, white, and orange would be difficult for every one; and certainly the analysis of white into purple and green, or into orange and blue, or into violet and yellow-green, is quite beyond the limits of the most attentive discrimination.

Complementary Colors. — The colors mentioned in the three pairs of the last sentence, when mixed in certain proportions by rotating disks, upon most eyes do result in the vision of an impure white. In general, white of great purity can be produced by mixing an indefinite number of pairs of colors which lie at some distance from each other in the color spectrum. "Hues" which, when mixed together, produce white, are said to be "complementary" of each other. The accompanying scheme symbolizes this fact of experience. (See Fig. 3, p. 68.)

Young propounded, and Helmholtz and others (especially, perhaps, Koenig) have elaborated, a physiological hypothesis which aims to account for the main facts in our experience with colors. It refers these sensations to the simultaneous excitement of three kinds of nervous elements in the retina, in varying proportions. A plausible paralbe drawn (so Scripture) between the use of colored screens in hotography and the effect produced by projecting three slides simultaneously, on the one hand, and, on the other hand, the resolution of colors into three retinal processes and the combination of the three in the brain to form all colors. So long, however, as our theory states itself in the terminology of nervous facts and processes, it remains as yet only conjectural. *That color-sensations, regarded as psychic phenomena, can all be produced by fusion of not more than three "fundamental" sensory processes, may be regarded as an estab-*

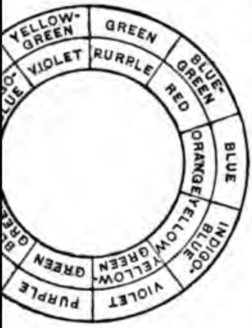


FIG. 3

ruth. By varying the degrees of brightness of light, all the ations of consciousness due to excitement of the retina are d.

Sensations of Pressure. — Among the various modifications of consciousness produced by exciting that most essential of all the end-organs, the skin, what may be popularly described as the "feeling of being touched" stands first. Little of a scientific character, however, can be said about this class of sensations. Histology shows that the nerves distributed in the skin terminate either in free end-fibrils or in a variety of minute structures essentially alike ("corpuscles of Pacini," etc.). If a point of metal, wood, or cork be moved lightly over the skin, a great variety of sensations are awakened, but only at minute areas will there be a definite "content-full" sensation of pressure. Between these areas, either other kinds of sensations result, or else the pressure-sensations themselves are comparatively indefinable, and "content-less." These minute areas of greatest sensitivity are, then, properly entitled "pressure-spots." Their arrangement, as the following diagram (Fig. 6) shows, is customarily in

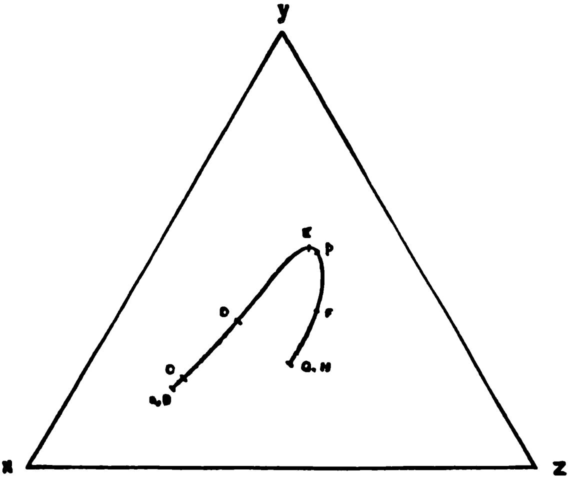


FIG. 5

which radiate from a kind of central point and run h directions as to form either circular, longitudinal, or pyramidal figures.

FIG. 6

Sensations of Temperature. — One of the most striking discoveries of modern experimental psychology concerns the origin of those modifications of consciousness which are called "feeling hot" or "feeling cold." "Heat-spots" and "cold-spots" (or minute areas of in sensitive to heat and not to cold, and con- y) can be located by experiment. These "temper- pots" and the "pressure-spots" appear never to be nposed. Their arrangement (see Fig. 7: *A*, "Heat- *B*, "Cold-spots") is various; but the lines they enerally radiate from centres coincident with roots hairs, and run so as to cross each other.

changes which occur in the tissue of the muscles as they contract and relax modify consciousness? Physiology, introspection, and speculation (based upon the necessities of psychological theory) have all been appealed to; and they have all returned answer on both sides. We believe, however, in the existence and the influence of muscular sensations as an important factor for the development of mental life. That is, *certain rather massive differences in our sense-experience depend upon the quality and quantity of the nerve-commotions due to contraction and relaxation of the muscles located in different areas of the body.*

There are three sufficient reasons, however, why we do not ordinarily notice qualitative differences in the muscular sensations: First, the differences themselves are rather gross and are usually less important to attend to for purposes of nice discrimination. An important exception, however, must be made to this statement in the case of the muscles of the eye. Second, these sensations are "buried," as it were, in the perception of some object, or the doing of some work, on which the muscles are employed. And, third, these sensations are thoroughly fused with tactual and other specific sensations which are more distinct and obtrusive in their qualities and which have a stronger feeling-tone.

(1) Physiology and histology have perhaps not yet demonstrated the presence of sensory nerve-endings in such relations with the muscular tissue that changes in the latter *must* excite processes in the former. But they have made these relations possible, if not probable. In spite of the fact that cutaneous anæsthesia and paralysis of muscular sensibility usually go together, cases arise where one occurs and the other is absent. Some patients can discriminate weights when the muscles are called into play, after sensibility of the skin has been lost. M. Beaunis knew a singer who could sing almost as accurately as before, when the sensibility of the mucous membrane of the larynx and vocal cords had been destroyed. Lussana found a patient who retained muscular sensibility after losing sensibility in a large area

in lying above the muscles. (2) Introspection, with attentive nation, seems to discern certain sensations which can be attrib- ther to the skin nor to the joints. These are often localized eper than the skin-sensations, and appear when we lift unu- ghts, or call out otherwise unaccustomed groups of muscles. sistent and satisfactory theoretical account of the origin and nent of our perceptions of external objects seems to favor, if ot imperatively demand (we believe the latter position ten- e important assistance of muscular sensations. This will learly in connection with the theory of perception.

tions of the Joints. — Another sort of modification of onsciousness, which, although ordinarily combined ctual and muscular sensations, can be experiment- wn to have a separate character, is produced by the ents of the limbs over their articulating surfaces. seous extremities and their synovial membranes are o be rich in minute nerves, and special end-organs n the neighborhood of all the joints. Goldscheider that, even with the hand held fast in a plaster make up our notion of the bodily Self. It is characteristic of them all that they are (1) comparatively "contentless," (2) obscurely localized, and (3) suffused with a strong tone of feeling — usually more or less disagreeable.

Sensations of each of the various classes differ among themselves in respect of both Quality and Quantity. If we may, for the moment, speak of them under the popular conception of "Feelings," we may say that in describing the sensory modifications of consciousness two questions may always be asked: *How* do I feel? and How *much* do I feel? The "how-I-feel" is called quality, and the "how-much-I-feel" is called quantity or intensity.

Relations of Quality and Quantity of Sensation. — It has just been said that quality may always, at least vaguely, be distinguished from the quantity of our sense-experience. But introspection, especially when assisted by experiment, shows that quality of sensation and quantity of sensation are intimately related. That is to say, it is difficult, if not impossible, to change the amount of any of the psychic processes called sensation, without also modifying its quality. In other words, as we experience *more of any kind* of sensation we notice that what we experience is *not precisely the same kind* of sensation.

Different psychologists have wished to lay the emphasis on one or the other of two conclusions concerning the nature of our sense-experience. Thus Sully says: "Quality is clearly distinct from quantity, and may in general be regarded as independent of it. That is to say, we can vary intensity without affecting quality." But Münsterberg declares that "quality and intensity are not two particular properties of the one sensation, but only the directions in which the sensation can be compared with other sensations." Strictly interpreting, we find neither of these authorities correct. Interpreting liberally, we of them correct. Thus, if I am going toward or m a bell that is sounding, I ordinarily attend he changes of intensity; it is heard as the same d growing fainter or stronger. But if I also ith a trained discrimination, I can become aware er all, it is a different bell-sound which I hear; rying "clang," as the relations of the overtones ndamental tone keep changing.

rther scientific study of sensations requires, then, should investigate the two related subjects: (1) ditions under which the qualities of sensations and (2) the conditions under which the intensity ity of sensations changes.

of Sensations depends upon the Sensory Organism. — odifications of consciousness which arise when nism of sense is irritated depend upon inherited ired characteristics of that organism. Any functurbance of the end-organs of sense impairs or sons can hear musical sounds an octave and more higher. Again, some are so "tone-deaf" that they cannot discriminate semi-tones and even thirds, while others can recognize 100–200 distinctions of pitch between successive tones of the ordinary scale.

The interesting phenomena of "color-blindness" illustrate the same truth. While 96 %, or more, of people can distinguish the principal "hues" derived by mixture of all three of the fundamental colors, and thus are entitled to be called "trichromats," 4 %, or less, can only distinguish the "hues" which are producible by mixture of two fundamental colors ("dichromats"). An unfortunate few are "monochromatic"; "as far as color is concerned there is no more meaning in it than there is to normal individuals in a photograph or an engraving" (Scripture). But both normal and color-blind persons differ in minute peculiarities. Even normal "trichromatic" eyes do not agree exactly in the proportions of the colors which they require to have mixed in order to match any other color in the spectrum.

As to the precise physiological reasons for so many individual variations, we are in almost complete ignorance. We can only reiterate our confidence that such reasons must exist. But this important psychological principle is undoubted: *The sense-experience of every individual is, so far as range of quality in each of the senses is concerned, peculiar to that individual.* Your world of sense-impressions and mine may differ more or less widely; one of us may be "quite shut out" of the world familiar to the other. It is certain that those two worlds can never be precisely the same. Your world of sense is *yours*, and mine is *mine;* yet we are living on terms of intercourse in the same world.

Quality of Sensations depends on Portion of Organ stimulated. — Even when the organ excited remains the same, and the kind of sensation following is not changed, changes of quality follow the movement of the stimulus over successive areas. The existence of pressure-spots, heat-spots, and cold-spots has already illustrated this. If we divide

a of the normal eye into three zones, rays which,
lling on the polar zone, make an impression of
ow, or green, all make an impression of yellow a
from the centre of the retina. On moving from
periphery, red may become orange, violet, then
very organ is a composite of a vast number of ner-
ents; and this fact corresponds, in a general way,
riations of sensuous impressions which its excitement
.

of Sensation depends on Previous Excitement. —
re nervous organism is active from the beginning
d of life. No particular process can be set up in
ere without feeling the influences resulting from
and simultaneous excitements of the same or-
The "principle of relativity," whose bearing on
lopment of mental life will become more promi-
er on, is provided for by the very structure and
s of the nervous mechanism.

close the eyes after looking intently for a few seconds on any bright object, we find the image of the object remaining for some time, and only slowly fading away. Such an after-image is called "positive." But on watching a white positive after-image, it may be seen to pass quickly through greenish-blue and indigo-blue to a violet or rose-color. And if we look long at a small black square on a white surface, and then turn the eyes off to a white background, a bright square will appear and fade slowly away. Such sensations are called "negative after-images." In general, the color of such an after-image will be "complementary" of the color of the object. Positive after-images are often explained as due to *inertia*, and negative after-images to *exhaustion*, of the nerve-elements of the retina.

(2) The phenomena of contrast fall, at least in part, under the same principle. These phenomena are of two kinds, "color-contrast" and "contrast of brightness." For example, a small square of white on a green surface, when covered with transparent tissue-paper, appears as a pale red on a surface of whitish green. Every bright object appears brighter when its surroundings are darker than itself, and every dark object appears darker with objects surrounding that are brighter than itself. That is, sensations which are contiguous in consciousness tend to modify each other's character.

Quality of Sensation depends upon Variations of Stimuli. — The most ordinary experience suggests what physics and psychology combine to prove in detail: The modifications of our sense-consciousness vary with the kind of stimuli applied to the end-organs. If we select acoustic vibrations of sufficient intensity, with a rapidity of 435 per second, normal persons are affected by these with a peculiar auditory sensation, which is called **a¹** in the international musical scale. Sensations evoked by acoustic waves that have a rapidity twice as great, or one-half as great, stand to this arbitrarily selected sensation in a peculiar, pleasant relation. And between any two tones an octave apart, six others are made to stand in the following ratios: —

Name	*C* : *D* : *E* : *F* : *G* : *A* : *B* : *C′*
Relation of single vibrations . . .	$1 : \frac{9}{8} : \frac{5}{4} : \frac{4}{3} : \frac{3}{2} : \frac{5}{3} : \frac{15}{8} : 2$
Relative number of vibrations . .	$8 : 9 : 10 : 10\frac{2}{3} : 12 : 13\frac{1}{3} : 15 : 16$

ver, when two or more "clangs" are sounded the resulting complex sensation is either an or a disagreeable modification of sense-conscious- ch receives the name either of "accord" or "dis- The simpler the mathematical relation between clangs that are sounded together, the more per- accord. Thus, Octave (1:2); Twelfth (1:3); :3); Fourth (3:4); Sixth (3:5); Major Third Minor Third (5:6).

case of color-sensations, variations in quality ues" of the spectrum) change as the number of lations changes. Thus, using the letters of the , physics gives us the following scale extending to 790 trillions of vibrations per second: *B* (450); ; *D* (526); *E* (589); *F* (640); *G* (722); *H* (790). ed into the language of our sense-experience, this at when the rays of light, so far as they modify sness at all, run in number up to and beyond of the end-organs, however, is very different for different kinds of sensations. And in our conscious experience the sensory modifications *grow* or *develop* into a perfection of their characteristic quality. Thus Cattell found that the time necessary to distinguish the different hues from a shade of gray of corresponding intensity varied as follows: for red, 1.28 σ; for orange, 0.87 σ; for green, 1.42 σ; for blue, 1.21 σ; for violet, 2.32 σ. The range of difference was from a minimum of 0.6 σ for orange and yellow to a maximum of 2.75 σ for violet. While we can discriminate several hundred sensations of sound due to the crackle of an electric spark or to contact with the tooth of a revolving wheel, in a second of time, without their "fusing," smells and tastes require a much longer period in order to define themselves.

It is a general principle that *even simple sensations, however instantaneously they appear to rise in consciousness, are really psychical developments; and that the full and precise quality of sensations is dependent upon the time allowed for discriminating consciousness.*

Quality of Sensation depends upon Intensity of Stimulus. — It has already been remarked that the amount of sensation influences the quality of sensation. "How much" we feel, and precisely "how" we feel, are not the same, but are dependently related. This influence itself depends upon the relation of conscious quality to the intensity of the external stimulus. For example, a white of less intensity is a shade of gray, and by diminishing the amount of light stimulus the sense-consciousness is modified from white to black, through all the shades of gray. At the minimum intensity of stimulus all the hues (except, possibly, the pure red of spectral saturation) appear nearly or quite colorless; they are no longer *hues*, in the strict meaning of the word. That is, the sensations, while losing intensity, have also lost their quality.

ty of Sensation. — Terms of quantity, when applied
ense-consciousness, may appeal to incontestable
ce. How a "strong" sensation differs from a
sensation, even when the two are classed together
ts quality, I know just as immediately as I know
differs from blue. On this immediate discrimina-
egrees of sensation, by focusing and distribution
ion, the entire science of "psycho-physics" is
. The application to conscious states of mathe-
onceptions, and so of almost all forms of more
perimentation, depends upon the same incon-
experience.

ableness of Sensation. — The attempt to measure
the amounts of our sensory experiences is full
lties, and some of the fundamental assumptions
y involved in the attempt are debatable. For
no one would misunderstand or dispute the
t: This sound seems to me louder than that; or,

The discussion of the measurableness of conscious states in general, and of the applicability of the "category of quantity" to them, as well as of the most accurate means for measurement, has been given much prominence in modern experimental psychology. Some writers have even gone so far as to deny that we interpret correctly the modifications of consciousness when we speak of them as *changes of quantity*. But others have used terms such as "threshold of consciousness," "unit of measurement," "psycho-physical science," etc., as though mental phenomena were "thing-like" entities of a geometrical order to which some kind of an actual measuring-stick could be applied.

Maxima and Minima of Sensations. — In the case of each of the senses, there are certain *limits* within which quantitative changes have their range. The answer to the question, *How much* do I feel? can never be either *more than* or *less than* so much. There is, therefore, both a "lower" and an "upper" limit to every kind of sensation-experience. Both these limits differ for the different senses, for different persons, and for the same person under different circumstances.

We may express all this concisely by some such formula as the following: If we let $\mathbf{R}$ = the range of sensation, or number of differing intensities of any kind of sensory experiences discernible by the individual, $\mathbf{S}$ = the sensitiveness of the individual to minute changes of intensity in any particular kind of sensation, and $\mathbf{C}$ = the capacity, or amount of stimulus which the particular sense is able to receive, then $\mathbf{R} = \frac{\mathbf{C}}{\mathbf{S}}$, where $\frac{1}{\mathbf{S}}$ (or the "unit of sensitiveness") is made the standard measure. In this formula $\mathbf{R}$, $\mathbf{S}$, and $\mathbf{C}$ appear as dependent variables.

The "lower limit" of sensation for the different senses has been investigated experimentally with a variety of results. Earlier results (Aubert and Kammler) made the lightest weight which gave pressure-sensations 0.002 gramme on the forehead, and 0.005–0.015 gramme on the volar side of the fingers. More recent experiments (Langlois and Richet) found that the coefficient of sensibility for the muscles used in respiration is very low as compared with that of the muscles of the

l trunk. A movement of the eyes answering to a contrac-
nly 0.0006 mm. of the inner muscles of the eyes can be
The skin is, under favorable circumstances, about as
o changes in temperature as a good thermometer ($\frac{1}{5}$° Fahr.,
It has been calculated that work done on the ear-drum
g to only $\frac{1}{543}$ billionth kilogramme-meter will, under the best
s, give rise to a sensation of sound. Aubert fixed the lower
light-sensations at $\frac{1}{300}$ of that reflected from white paper
full moon. Some persons can taste one part in 392,000
e, or even one part in 1,280,000 of strychnine. And it is
hat the incredibly small amount of $\frac{1}{460000000}$ milligramme
tan has been smelled.

sly, it is unsafe to the organs or impossible experimentally
ine how much of most forms of sensory stimuli can be
ed as quantity of sensation (the "upper limit").

al Quantitative Relations between Sensations and
—It is obviously an interesting problem for psy-
sics to discover the law which controls the relations
changes in the amount of external stimulus and
g changes in our sensory experience. The most

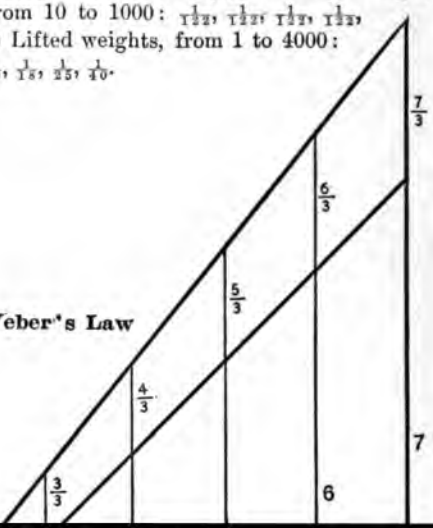
with pressure-sensations, with sensations of sound, of light, and even of taste and smell — although the two latter do not easily lend themselves to experimental determination. The result was the announcement of a general rule called "Weber's Law": *For any given class of sensations, the least noticeable difference is a constant fraction of the sensation.* This law may be stated in several different ways; among others, the following: The strength of the stimulus must increase in geometrical proportion, if the estimated strength of the sensation is to increase in arithmetical proportion. Translated into plainer terms of experience, this means: If you want to produce an appreciable change in the amount of any sensory impression, you must add to, or subtract from, the stimulus a nearly uniform proportion of the amount. For it is *change* rather than *absolute amount* of sensation-experience which is consciously measured.

Validity of Weber's Law. — The above-mentioned formula turns out, as tested by actual experiment, only approximately correct. For the median ranges of sensation, especially of visual sensations and pressure-sensations, it is most nearly exact. Near the upper and lower limits, and in complicated and nice comparisons, many confusing considerations seem to influence our discriminations. Making allowances for these, however, we may pronounce this formula to be a valid psycho-physical law — so far as such a term can properly be applied to conscious phenomena.

To illustrate Weber's law: if for a weight of 10 oz. we fail to perceive a difference of less than 1 oz., we shall fail under similar circumstances to perceive a difference of less than 1 lb. in 10 lbs. ("least perceptible difference" = $\frac{1}{10}$).

The following list gives specimen results of experiments in various senses. [If the law were absolutely exact, the fractions would remain unchanged; but the series, as given, show how the results fluctuate as the stimulus increases]: —

tensity of sound (noise of falling ball) with a range from 1 : $\frac{1}{12}$, $\frac{1}{17}$, $\frac{1}{19}$, $\frac{1}{21}$, $\frac{1}{26}$, $\frac{1}{23}$, $\frac{1}{26}$, $\frac{1}{20}$, etc. (2) Intensity of light ks) with range from 10 to 1000: $\frac{1}{122}$, $\frac{1}{122}$, $\frac{1}{122}$, $\frac{1}{122}$, $\frac{1}{118}$, $\frac{1}{117}$ $\frac{1}{109}$. (3) Lifted weights, from 1 to 4000: , $\frac{1}{14}$, $\frac{1}{18}$, $\frac{1}{16}$, $\frac{1}{19}$, $\frac{1}{20}$, $\frac{1}{18}$, $\frac{1}{25}$, $\frac{1}{40}$.



Weber's Law

Fechner's Law. — In accepting and modifying Weber's law, Fechner made two suppositions: (1) The least perceptible difference always means to us the same thing mentally; it may therefore be treated as a constant quantity. (2) What is true for finite differences will be true for infinitely small differences.

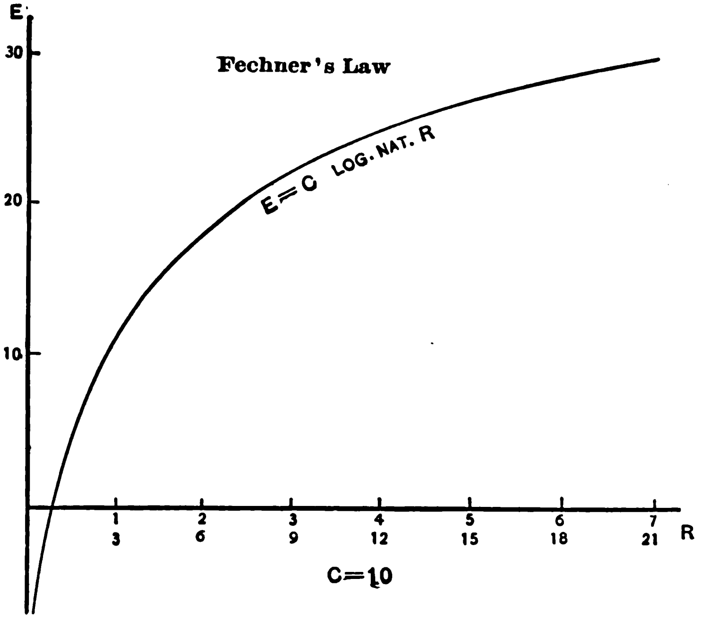


Fig. 9

With the two foregoing suppositions we have the experimental results treated by this distinguished physicist and psychologist as the basis for the most wide-reaching metaphysical theories of the relations of body and mind, and of matter and mind generally. But this, as we have already indicated, is to treat the noticeable psychical changes in quantity as though they were entities. The psychologist can only accept this law as tested by its ability to furnish a brief expression for a series of observed psychical facts.

athematical statement of Fechner's law we have $\mathbf{dE} = \mathbf{C}\frac{\mathbf{dR}}{\mathbf{R}}$,
= the amount of the stimulus, **dR** the increment of the stim-
C the same kind of a constant as that denoted by this letter
ting Weber's law. Hence $\mathbf{E} = \mathbf{C} \log \mathbf{R}$; or the amount of
ion (**E**) varies as the *natural* logarithm of the stimulus (log
e constant as before (**C**). The same law is expressed in
panying figure (No. 9), where the values of the stimuli are
the horizontal line. The upper row of figures gives the
e stimulus in physical units, *e.g.*, grammes; and the lower
the same values with the least noticeable sensation as a
n for each value, as expressed in terms of the least notice-
tion, we may count off on the vertical line (the "scale of
") a number equal to the natural logarithm of that value.
nt for each individual case (in the figure, $\mathbf{C} = 10$) adjusts
f sensation to its proper height.

ion of the Senses. — The purely psychological view
ture and development of our sense-experience has
portant bearings upon the genesis and training of
of the senses. Sensation has been seen to be a

[The literature accessible for the study of the psychology of sensation is especially rich. Brief popular introductions are McKendrick and Snodgrass: Physiology of the Senses; Bernstein: Five Senses of Man. More detailed treatment may be found in Mach: The Analysis of the Sensations; and Scripture: The New Psychology. The more advanced student may be referred to the monographs of Helmholtz: Physiologische Optik und Tonempfindungen; Stumpf, Tonpsychologie; and E. Gurney: The Power of Sound. The experimental and theoretical discussion of Weber's and Fechner's law has called forth such monographs as Fechner's Elemente d. Psychophysik; G. E. Müller: Zur Grundlegung d. Psychophysik, and others. Most students, however, will find quite enough to start and guide their inquiry in Ladd: Elements of Physiological Psychology, pp. 356–381; and James: The Principles of Psychology, I, pp. 533–549.]

CHAPTER V

FEELING

s no other possible way of telling “what it is to n by appealing directly to the experience of feel- *very life and essence of feeling is in being felt.* annot, therefore, have its intrinsic nature defined of knowledge.

of Feeling. — The favorite description of the y of affective or emotional consciousness is to ubjective.” Thus one writer says that the term used to “denote the subjective aspect of con- s anywhere and everywhere”; and another de- Feeling is subjective experience *par excellence.*” a side of truth in such statements. We have

But these attempts have failed; and they always will fail, for the very good reason that the affective aspects of our conscious states are immediately and indubitably recognized as something essentially different from our thoughts or ideas or deeds of will. There is no distinction which men make any more readily or incontrovertibly than the distinction between how *they feel* and their own perceptions or ideas as to how *things behave*, or their own resolutions to *effect changes* in things. In saying this, however, it is not meant to contradict the truth already repeatedly asserted; namely, all three fundamental forms of mental life are given in the unity of one consciousness. Still, as Dr. Ward has declared: "Feeling, as such, is, so to put it, matter of *being* rather than of direct knowledge."

Several incorrect views as to the nature of feeling meet us at the very threshold of the subject. They all seem among the most astonishing of psychological vagaries, so flatly do they contradict the plainest deliverances of consciousness, and so incapable are they of adapting themselves to the needs of a comprehensive and satisfying psychological theory. Among such views the following three require mention. First: the *physiological theory* of feeling begins by affirming that all affective modifications of consciousness, as such, are only a becoming-aware of the condition of the nervous system under the action of varying quantities of stimuli. To this it is quite sufficient to reply that the very conception of feeling is not "a becoming-aware" of anything, but "a being affected" somehow; and further, that the most refined physiological research has not as yet made us immediately aware of the conditions of the nervous system which accompany the varying kinds and degrees of feeling. How can my being in such, or such, a state of feeling be identified in nature with any doubtful physiological theory?

But, second, the *Herbartian theory* of feeling makes the existence and characteristics of feeling dependent upon the character of the ideating activity; and this in such a way that the feeling, as such, is the becoming-aware of the reciprocal action of the ideas. As the most masterly writer (Volkmann) of this school declares: "Feeling is to be considered as the consciousness of the process of ideation itself, as distinguished from consciousness of this or that particular idea." Now that our thoughts and ideas do influence our feelings is a plain and popular statement of the truth of experience. Moreover, that the flow of the stream of ideation and thinking makes itself felt in peculiar forms of accompanying feelings is a psychological principle which needs to be further examined. But when the most primary conscious experiences are identified with the recognition of an abstruse and doubtful mathematics of ideation, the testimony of the "inner witness" is quite too much strained in the interests of a school of psychologists.

The *third theory* of the nature of feeling *identifies all feeling with pleasurable and painful sensations.* Biology, invading psychology, has favored this theory. The apparent fact that certain minute areas of the skin, when stimulated, are more sensitive to such excitements as result in disagreeable (or agreeable) modifications of consciousness has furnished warrant for a leap to the tremendous conclusion: All feelings, as such, are reducible to the "pleasure-pain" series of sensations. This leap accomplishes two things at once: it takes the place of proof that all agreeable and disagreeable consciousnesses are to be classed with sensation-experiences; and it assumes that all feelings, as such, are only different intensities of such agreeable and disagreeable consciousnesses (*i.e.*, belong to the pleasure-pain series).

The theory which maintains that the pleasure-pain sensory modifications of consciousness constitute all there is — so to speak — of human feeling, as such, is confuted at every point by psychological considerations: (1) The conviction that human feelings are fitly spoken of as ethically "noble" or "base," and as æsthetically "refined" or "coarse," may be appealed to in refutation of this theory. (2) Without discriminating consciousness we cannot, of course, know our own feelings as differing either in kind or in degree. By attentive discrimination, however, I do recognize many important differences of quality just as immediately and indubitably as the varying degrees of intensity to my pleasures and pains. How can it be maintained in the face of consciousness that the feeling of *surprise* does not differ in quality from the feeling of *expectation*, — either of which may be more or less painful or pleasurable? Does the feeling of *doubt* differ from that affective consciousness which we call *conviction*, only by having a different place in the intensity belonging to the pleasure-pain series? But (3) this theory is self-contradictory throughout. For by arranging our pleasures and pains along a scale of intensity and then applying a compound term to all members of the scale (namely, "pleasure-pain") we do not annul or explain, the distinct difference between pleasure and pain themselves. Pleasure and pain *are* left different in some characteristic other than mere differences of quantity. They are so different that they may fitly be called "opposites," and placed at different poles. But what common characteristic renders it possible to class these opposites together, except just this; they are both *feelings?* The theory is forced to hold, then, that two kinds of feelings, as such, which are inherently different in kind, may run along parallel so far as quantity is concerned. But this contradicts the fundamental assumption of the theory.

Physiological Conditions of Feeling. — Although all affective modifications of consciousness cannot be reduced to physiological processes of which we are conscious, a plausible view may be formed of the physiological conditions of these peculiar psychical processes. Investigation, however, has as yet only made it possible to propose a view that may claim to be plausible. Two classes of facts require to be explained: first, the changes in kind of our conscious states of feeling; and, second, the rise and fall in degree of the different kinds of such conscious states. We believe that the best account of the physiological conditions of all the feelings is afforded by the following principle: *At any particular moment the kind and amount of feeling experienced has for its physiological condition the total complex relation in which all the subordinate neural processes, set up by the stimuli of that moment, stand to one another and to the "tendency," or direction, of pre-existing related neural processes.*

In giving the detailed proof of the foregoing conjecture, one remarkable difference between the conscious processes which psychology treats, and those processes in the brain which are supposed to be specially connected with the conscious processes, demands consideration. So far as anything can be known about the processes of the brain, they are all of *one kind*, essentially *alike.* They are chemico-physical changes,— movements of the molecules and atoms of the cerebral substance. The brain, like every material an only be the subject of movements. But we n that discriminating consciousness analyzes the s processes into *three* essentially *unlike kinds*, all three are found together in the unity of the f consciousness. These three processes are per- r thinking somewhat, feeling somehow, and doing g. The "feeling somehow" must, then, have its gical conditions in some kind and degree of mo- novements in the nervous system — especially in ance of the brain.

owing considerations support our theory of the physiological of all feeling-consciousness. (1) We have little knowledge iate perception of the size, shape, temperature, and movement rcostal and visceral organs. But from all these organs an ble *mixture* (or *mélange*) of nerve-commotions is ceaselessly through the cerebro-spinal tracts to the brain. It is chiefly gives conditions to our emotional tendency, or mood, ary impulse. It is largely productive of that class of lings which forms so much of the "feeling of self," as in and uncertain changes in the stimuli — as by a "flickering" light or an "interrupting" and "shocking" noise — indicate a "more or less profound troubling of the organism."

(4) The characteristic feelings of the two sexes and of the different ages are explained in the same way. The rapid metabolism of the infant, and the sluggish digestion and circulation of old age, give conditions to the characteristic feelings of each time of life. And every particular strong emotional stimulus has its effect as a "semi-chaotic" surplus relative to the entire life of the bodily system. Thus intense sensations are enjoyable to a hearty and mature body, but are painful to the weak and undeveloped organism.

The Kinds of Feeling. — What are called "feelings," in the language of every-day experience, are very complex conscious states. They are never *merely* affective or emotional, but are fused or associated with simultaneous perceptions, thoughts, ideas, and deeds of will. In this way the description of these complex examples of the developed life of the mind becomes greatly complicated. The only available means for classifying the feelings is to take account of these connections. According to the connection or reference of the complex modifications of consciousness, when considered "feeling-wise," the following classes may be distinguished: (1) Sensuous Feelings, or such as are dependent upon the different qualities of the special senses and of so-called "common feeling"; (2) Intellectual Feelings, or such as depend upon the character of the processes of ideation and thought; (3) Æsthetical Feelings, or such as arise in connection with the perception or imagination of what we call "beautiful" or its opposite; and (4) Ethical Feelings, or such as arise in contemplation of those forms of conduct which we call "right" or its opposite.

Sensuous Feeling. — Certain emotional modifications of consciousness attach themselves to all our sensations, — more obviously to the more intense sensations, — and thus constitute the subjective side of sensation-consciousness.

The phrase "sensuous feelings" emphasizes the subjective side of all sensory experience. Popular language recognizes the fact that sensations of smell and of taste, for example, may be described as "heavy," or "enlivening," or "spicy," and as "exciting" or "depressing." This description emphasizes something in them, however, besides their intensity or their characteristic sensation-quality. The "affection" produced, for example, by the heliotrope is different from that produced by the Japanese lily. This is, in its way, as true as that one sensation must be called the smell *of* the heliotrope, and the other sensation the smell *of* the lily; while both may be of about the same degree of magnitude and equally pleasing or displeasing. Sensations of touch, of temperature, and of muscular activity, differ in their characteristic accompaniments of feeling. We cannot easily "feel" grave and dignified when our muscular and tactual sensations are such as accompany a mincing walk or a hop-skip-and-jump. We cannot have the comfort of feeling "cuddled," and of feeling "buoyant" in motion, at one and the same time.

Musicians have always attached different kinds of feeling to tones of different *timbre*, to different keys and chords and intervals. Such distinctions may easily be run out into the regions of fancy; but they are based on indubitable facts of human affection. Stumpf — musician as well as psychologist — tells how his son Rudolph, a child of four-and-a-half years, when he had to choose between two trumpets which differed by a tone, preferred the "darker one." The "grave" pleasure of feeling belonging to the bass register differs in another way than that of mere intensity from the "stirring" of feeling by a tenor voice. And who that knows anything about music could fail to discriminate, as of a markedly different quality, the "sweet-pain" of minor strains and the "strenuous sweetness" of a high-pitched major? The feeling of "grace" which belongs to Mozart's Opus 46 in E flat is not the same kind of pleasure as the feeling of "passionate fervor" belonging to his Opus 47 in G minor.

The feelings which fuse with the different sensations of light and color, or which follow upon attending to the characteristic quality of these sensations, have been differently described by different persons. That such feelings are a genuine factor in consciousness our most common forms of speech abundantly show. Some colors are "cheerful" and others are "mournful." Some shades and tints are "warm" and others are "cold." To account for the exciting influence of red upon many animals, by its conscious association with the sight of blood, seems unsatisfactory. This influence is more like that experienced by many persons on receiving the impression of certain smells. Höffding calls upon us to observe how, with increase and diminution in the amount of illumination, "the effect on feeling sustains a corresponding change." It is well known how much significance for feeling Goethe found in his experience of the different colors. The misfortune of seeing the world through "jaundiced eyes" is not merely a pathological affair.

The important modifications of "common feeling" and of the "feeling of self" which accompany disturbance of the obscure and mixed sensations that arise from the internal organs of chest and abdomen are well known. Not infrequently these disturbances lie at the base of serious perversions of the entire current of mental life. The man who feels his own heart or other viscera in unfamiliar — not to say painful — ways, begins by feeling himself "queer"; he may end by not feeling "at all like his old self," and even with the partial or almost total obscuration of his conceptions of self.

Feeling of Relation. — So far as is necessary for our present purpose, the feeling of relation may be treated as the one formula applicable to many of the higher intellectual, æsthetical, and ethical emotions and sentiments. Here the general principle may be stated as follows: *The character and rate of the change which takes place in the sensational and ideational factors of the stream of consciousness determines certain characteristic "affections."* All the affections may be considered, on one side, as different forms of the "feeling of relation." Both Mr. Spencer and the Herbartians are wrong in their view of the nature of t and of feeling, in this mutual dependence. But e right in insisting upon the important truth, too eglected by most other psychologists: *One feels, as knows, the characteristic differences in the flow of the n of consciousness.*"

time-rate of the change in our sensations and ideas ines certain feelings of relation. A fairly rapid equable flow of the processes of ideation, percep- d thinking, produces feelings of pleasurable excite- of being alive in a safe and controllable way. rapid flow of these intellectual processes produces ling of confusion, of being "run away with" by wn sensations or ideas. On the contrary, too slow o the same processes occasions feelings of languor wsiness, or of tedium and depression of spirits. motional experiences which characterize insane cholia," on the one hand, and insane "mania," other hand, depend largely on the time-rate of the sions in argument; and that they accept or reject the expressed conclusions of others, largely as those conclusions modify their affective consciousness. Correct memory, too, is helped out and confirmed by a certain form of feeling; incorrect memory is checked and chastened by a different form of feeling. More complex feelings of relation will be considered later on.

But the illustrations of our contention are without number. They comprise the entire field of mental life. We can only, at present, remark again how deplorably meagre is that view of the nature of human feeling which reduces it to terms of the varying magnitudes in a certain kind of sensations called either pleasure or pain.

Feeling as "Pleasure-Pain." — Although affective modifications of consciousness cannot properly be described as mere variations in intensity of pleasure and pain, the terms "agreeable" and "disagreeable" undoubtedly apply to most of our feelings. For example, the feeling of surprise may be of such a "tone" or character as to be welcome; on the contrary, it may be more or less repulsive. The same thing is true both of all our simpler and our more complex forms of feeling. The fact that in developed mental life we can often (but by no means always) give *reasons why* the particular feeling is agreeable or disagreeable, does not at all disturb the more fundamental fact; *feeling, as such, is agreeable or disagreeable.* This fundamental fact has been expressed in many ways; and psychologists have hotly debated over the way of expressing the fact. We repeat: the fact is that most of our feelings are either agreeable or disagreeable; but we cannot account for the variety of our feelings, as such, by resolving them all into these two kinds of characteristics which most feelings possess.

This general relation of pleasure-pain to the affective modifications of consciousness we prefer to indicate by calling pleasure and pain (or the being agreeable or disagreeable) the "*tone*" of feeling. Any one who does not like this figurative phraseology is at liberty to adopt a better — only if, however, he thus provides for all the facts of experience.

General Influence of Pleasure-Pain. — It is scarcely necessary to dilate upon the influence over human life, whether it be that of the individual or that of the race, which is exercised by the various forms of pleasure and pain. The poets have emphasized this influence; we may recall in this connection Schiller's "Hunger and Love" as the great impulses to live and to work. Political economists have often rather overdone the same thing in the interests of the lower forms of happiness and unhappiness so-called. Yet we may well exclaim with them: "It is difficult to conceive what life would be if pleasure and pain were stricken out . . . leave them out, and life and the universe no longer have meaning." It needs to be noticed, however, that, while the popular usage tends to restrict the word "pain" to experiences which are sensuously disagreeable in a high degree, psychology covers all degrees and kinds of the agreeable and the disagreeable with the compound word "pleasure-pain."

Neutral Feelings. — That most affective experiences have some slight degree, at least, of the pleasure-pain characteristic — some "tone" — is admitted by all. But it has been much debated whether any of our feelings are absolutely without such tone. Neutral or indifferent feelings were recognized by Reid, but disputed by Hamilton. James Mill asserted that the greater part of our sensations are colorless as respects the pleasure-pain qualification. Bain, too, claims that "we may feel and yet be neither pleased nor pained." And Wundt has attempted to prove by plotting a curve for the varying intensities of the two opposites, pleasure and pain, that we cannot pass from one to the other without going through a "zero-point," or point of indifference. Experience, however, does not seem uniformly to correspond to the continuous flow of a curved line; as in the case of a child stung by a bee while it is eating honey. On the other hand, many psychologists have attempted to prove the contention that we always feel at least slightly pleased or slightly pained. And even Lotze has said: "We apply the name 'feelings' *exclusively* to states of pleasure and pain in contrast with sensations as indifferent perceptions of a certain content." Of course, those whose theory identifies feeling with pleasure-pain cannot consistently speak of *neutral* feelings.

The truth seems to be that in fairly good health, and when occupied with work not decidedly distasteful, men pass much of their time without any conspicuously conscious tone of pleasure or pain characterizing the stream of consciousness. But there are few, if any, feelings which do not develop some pleasure-pain tone when they are made the objects of purposive attention. To make, offhand, as it were, a uniform law seems scarcely warrantable. Nor does there seem any good reason to be adduced why the experience of all persons should follow a uniform law in this regard.

Conditions of Pleasure-Pain. — Biology has attempted to handle the problem of the origin of our pleasures and pains. But it can only assist psychology by showing how increased intensities of pleasure or of pain may become *attached* to certain physiological functions in accordance with the biological principle of evolution. Here both biology and psychology have to assume the existence of this characteristic tone of the subjective side of consciousness. It is rather in the study of ethics, of æsthetics, and of social phenomena that satisfactory "reasons" in the place of partial causes for many of the phenomena may be found.

Even the immediate physiological conditions of our pleasures and pains are obscure. Observation and experiment have as yet established no universal physiological law bearing upon the subject. The most important and indisputable generalization has reference to the dependence of the pleasure-pain tone of feeling on the varying intensities of the stimulus. We shall refer to this later.

It has been claimed that the existence of so-called "pain-spots" in the skin is demonstrated by experiment; and that therefore we are warranted in classifying our pains with the specific sensations. Apparently, however, all that has been shown is this: certain minute areas of the skin are relatively sensitive to stimulation; they respond with sensations of a painful tone, under lower intensities of stimulus. The sensation of touch and the feeling of pain, both due to stimulating the same areas, are sometimes separable both in time and in fact; and disease may render a certain member of the body insensible to pain and not to touch, and conversely. Severe cold, chloroform, and hypnosis, sometimes occasion the same separation of the sensation of pressure and the so-called sensation of pain. But these facts do not prove the character of pain as a specific sensation. They rather constitute an argument against identifying any sensation with the painful tone of feeling which is its customary accompaniment. The separation in time, in such cases, is explained by the physiological fact that the nerve-processes on which the pain is dependent are the more widely diffused, both peripherally and centrally. There is abundant proof that such processes travel more slowly than the sensory processes; for when one is struck a smart blow, the perception of being struck comes first, and the pain of being struck follows after.

Statements such as that "pleasure is the positive feeling of a thing which accords with our nature, as pain is the negative feeling of an object which is contrary to our essence," are more sonorous than illumining. The same criticism seems to us to apply to Grant Allen's declaration: "Pleasure is the concomitant of the healthy action of any or all of the organs or members supplied with the afferent cerebro-spinal nerves, to an extent not exceeding the ordinary powers of reparation possessed by the system." Mr. Allen has himself characterized as "too vague" the theory of Bain which connects states of pleasure with an increase and states of pain with an abatement of some, or all, of the vital functions. Lotze's view is more tenable: "Feeling (that is, as pleasure and pain) is only the measure of the partial and momentary accord between the effect of the stimulus and the conditions of vital activity."

No merely physiological theory yet proposed is entirely satisfactory in explanation of our pleasures and pains. All such theories are subject to the following, among other, objections: (1) There is no proof that many slight and yet disagreeable intensities of certain stimuli are harmful, except the conjecture which the theory supports. (2) These theories neglect too largely those conditions of the central nervous system in which (rather than in conditions of the organs exposed to the stimulus) the very nature of our pleasure-pains has its physical basis. (3) These theories offer no explanation of the large field of pleasures and pains that are non-sensuous.

Intensity of Excitement and Pleasure-Pains. — The one thing which is most indubitably known about the primary causes of disagreeable or agreeable feelings is that their tone is dependent upon the amount of neural excitement. It is this fact which shapes almost all the language with which the characteristics of feeling are expressed. Men speak of being "pierced" or "crushed" with sorrow; of being "overwhelmed" in a sea of pain. Their pleasures are characterized as "refined" and "gentle" or as "coarse" and "strong." But the amount of various sensations, or of the different intellectual and æsthetical processes, which different individuals can "*bear*" (how expressive this word!) differs enormously. A somewhat complex, and necessarily rather indefinite, formula may be used for the entire set of relations which is maintained between intensities of excitement and the resulting pleasure-pain. That is to say: *How much in amount of neural processes can be "borne" without pain, or even enjoyed, varies with an indefinite number of considerations resolvable into the constitution, habit, present condition, and "occupation" of the centres of the brain.*

The principle just stated is illustrated by all the recent experiments which have dealt with the question. For

the following table summarizes results reached
riffing on the amount of pressure in kilogrammes
st reached the "threshold of pain" in the several
persons experimented with. The same stimulus

50 boys	40 college men	38 law students	58 women	40 college women
12–15	16–21	19–25	16–22	
4.8 kilgr.	5.1 kilgr.	7.8 kilgr.	3.6 kilgr.	3.6 kilgr.

o corresponding organs in different human bodies
sion different amounts of that "semi-chaotic sur-
nerve-commotions in the centres of the brain to
e mind responds with feelings of pleasure or of
he pleasurable or painful character of the response
also upon the constitution, habits, and present
, of those centres. Strong sensations usually
vivid mental images are likely to be disagree-

stand to the varying intensities of our sensations as the varying intensities of the sensations stand to the varying intensities of the stimuli. It is no unmeaning figure of speech, when we say that a soul, with subtle and changing capacities and habits of feeling and of self-control, "stands between" the physical stimulation and the tone of feeling evoked.

Beaunis has tried to represent the dependence of pleasure-pains upon the intensity of sensations by the following scheme:—

0	10	20	30	40	50	60	70	80	90	100
Stadium of no sensation		Threshold of excitation	Stadium of indifference	Threshold of pleasure		Stadium of pleasure			Threshold of pain	Stadium of pain

The following figure (No. 10), which is adapted from Ziehen, who adapted it from Wundt, may serve to compare the results of experiment on this subject with Fechner's law. [Here **E** *min.* and **E** *max.*

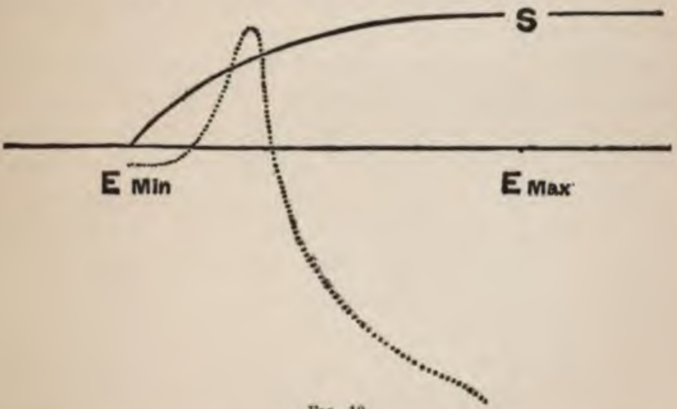


Fig. 10

represent the maximum and the minimum intensities of the stimulation. The abscissa line is the threshold, between pain, whose curve is below, and pleasure, whose curve is above. The continuous line shows the relation between intensity of sensation and intensity of stimulus. The dotted line represents the pleasure-pain series.]

of "Cardinal Value." — It is an ingenious view of
hat the maximum amount of pleasure attached to
tion arises where the sensation ceases to increase
e proportion to the strength of the stimulus.
e he calls the point of "cardinal value," because
place where the sensation is most valuable for
of perception. This theory introduces the idea
purpose into our most fundamental experiences
pleasure-pain series. It affirms that all sensuous
pains are *relative* to the amount of cognition we
ugh our sensations. They somehow serve the
knowledge. In this connection it should be
ow the failure of weak and unsteady sensations
n securing the ends of perception is, in part, the
on of the pain which accompanies them. *They
nd yet evade the focusing upon them of attentive
iminating consciousness.*

f Pleasure-Pains. — The use of the same words to

In this connection the great differences which characterize different individuals deserve another notice. To some persons unæsthetical arrangements of color cause more disagreeable modifications of consciousness than do sharp bodily pains. And to take less striking idiosyncrasies: The ear of the Greeks scarcely tolerated the imperfect consonances of the Major and Minor Third. But Handel accepted "Fourths," and Beethoven "Fifths"; while the modern Wagnerian music is full of "jargons" of tones which its devotees claim to find delightful. The Japanese are agreeably impressed by intervals which are almost intolerable to us — partly, perhaps, because of the association of such tones with the sad and weird sounds of nature.

"Value" as applied to Pleasure-Pains. — Modern biology is fond of claiming that the hideous "bulk" of our painful skin-sensations accords with the principle of evolution. In the "ancestral worm-like" forms from which its theory would derive man, such strong reactions might have had a "beneficial tendency." Doubtful as this theory is, it suggests the same teleological view of pleasure-pain which Wundt's theory of "cardinal value" espouses. What we are interested to notice here, however, has connections which will appear later on. *Mere intensity of pleasure or pain does not seem to serve for the sole estimate of the place which the pleasure-pain series has in the development of human mental life.* Using as a standard the mere amount of pain, most men might agree with Heine: "If I had my choice between a bad conscience and a bad tooth, I should choose the former;" or with the cynical French maxim that "the chief conditions of happiness are good digestion and no conscience." But *ideal pains and pleasures are not comparable with sensuous pains and pleasures, merely as regards intensity.* In estimating these higher feelings we are guided by more complicated standards of value.

Are there So-called "Natural" Pains? — It is the tendency of all biological or physiological theories to assume that painful states of consciousness, however slightly so, are abnormal. It is difficult for them to admit that what is "bad" for the organism should be agreeable, or that what is "good" for the organism should be disagreeable. This is one of numerous instances where natural science tends to the belief that what *ought to be* so *is* so. The psychologist, however, seems compelled to admit the existence of absolutely unpleasant sensations (*i.e.*, sensations that are disagreeable without regard to their intensity or to the vital interests of the organism). Thus M. Beaunis holds that certain odors, savors, sounds, and tactual impressions, *qualitatively considered*, are normally disagreeable. The behavior of infants would seem to indicate this. The intrinsically painful character of certain feelings of relation has been already shown. Here, indeed, the principle of maladjustment to the previous condition, and so of danger to the organism, must, in general, be applicable. The way that incoming sensory processes interrupt the smooth flowing of the current of consciousness determines the pleasure-pain character of the accompanying feelings. But even this would seem to imply that some of the necessary nerve-conditions of our intellectual processes are "naturally" painful.

When we come to consider the more complex states of feeling with which ethics chiefly deals, the problem grows more complicated. Anger and revenge seem to be naturally agreeable, rather than the reverse, if the intensity of the emotions is not too great. For "weak hearts" and "tender consciences" these passions are painful. But we find vigorous Martin Luther praising the physical benefit he sometimes received from getting mad to the core of his being. The savage or the child chases his enemy in flight and thrusts him through with a spear or beats him with a stick, in a sort of ecstasy of joy. *In strong excitement of feeling of every kind, while the emotional stage endures, the normal tone is one of pleasure in the excitement.* Yet some weak excitements are normally disagreeable. And, especially, where education has developed the æsthetical attitude toward sensuous pleasures:—

> "A surfeit of the sweetest things
> The deepest loathing to the stomach brings."

Rhythm of Pleasure-Pain.—In all nerve-processes, and in the correlated conscious states, the principle of rhythm is apt to appear. The life of the nervous system cannot be maintained at a steady uniform pitch. The intermittent and recurrent character of the simplest pleasures and pains is apparent in the behavior of infants; and the complex phenomena offered by the affective experience of adults show the same principle. Connected with this characteristic is the tendency to pass quickly from one form of feeling to its opposite. "That extremes meet," says Höffding, "is nowhere better exemplified than in the life of feeling, where the sharpest and most important contrasts are indigenous." In being born, and bathed, in being subjected to all the assaults of nature upon the end-organs of sense, as well as in learning to digest its food, to use its limbs, and to express and gratify its wants, the infant is kept *oscillating* between pleasure and pain.

Feelings are not only recurrent, like all other psychic phenomena, because they occur in time-form, but they are also subject to rhythmic alterations in ways peculiar to themselves. None of our pleasure-pains remain at a perfectly uniform tension; they all have what has been called "an irregular periodicity." In not a few cases the periodicity is regular enough to constitute a rhythm.

Pleasures of Rhythm.—In connection with the rhythmic character of pleasure-pains we have to note the natural

ivated pleasures of rhythm. Periodically recur-
eable sensations and ideas have their agreeable
htened by the feeling of their periodicity. The
muscular fatigue, of abraded skin, and wearied
f sense, are often submerged in the pleasures of
Such rhythmic movements as dancing, march-
ping, etc., are most agreeable movements. The
"heave-ho" of sailors as they lift anchor, the
me" of the Japanese coolies under their burden
avy foreigner in his sedan chair, and the periodic
of the workmen as they drive piles or handle
are instances here. The pleasures of reading
ing poetry or music are largely of this order.

> "How sour sweet music is,
> When time is broke and no proportion kept."

of Repetition. — The principle of "cumulation" at "missing" accustomed sights and sounds and tastes. They do not agree with Lamb in estimating highly the pleasures of first landing in a foreign country. "The fascinating, *monotonous* minor themes" of the West Indian strains which Gottschalk used to play should therefore please them greatly.

Diffusion of Feeling. — It is a psycho-physical principle that *every state of predominatingly pleasurable or painful emotion tends to involve the whole area of the brain, and to influence an increasing number of the outlying organs through the supreme control which this central organ has over all the bodily functions.* In proof of this principle might be instanced the extreme nausea which follows certain slightly disagreeable smells or tastes, the general depression of spirits which a multitude of very small disappointments or reverses occasions, the enlivening effect on our entire "mood" caused by repeated sniffing of aromatic flavors or stimulation of the nostrils with ammonia or eau de cologne, the convulsions of laughter into which a series of "small" jokes may throw one, etc. On the psychical side, as respects the tone of consciousness, what depths of despair or heights of contentment may mark the closing hours of a day or of a life that has been characterized by many little pains or little pleasures!

Association and Feeling. — It is difficult always to tell just what of our pleasure-pains are *primarily* connected with the sensations, feelings, or ideas, with which we find them connected, as a matter of fact, in the later developments of mental life. The influence of "association" — in the most general use of that word — upon the pleasure-pain characteristics of experience is undoubtedly enormous. Association seems to reach to the very roots of the life of feeling as we are able to study the manifestation of that life in the individual man. Doubtless it goes back to the very roots of the life of feeling in the race. This principle is especially interesting and important in its bearing upon the development of ethical, æsthetical, and religious feeling. We shall return to its consideration after we have prepared ourselves by the study of the phenomena of association.

In this way many experiences, or factors of experiences, which in other connections would remain neutral or be positively agreeable, become slightly or intensely disagreeable; and the reverse. For example, the sensations produced by contact of cool and slimy objects with the skin are usually very unpleasant. In what meaning can we call this tone of feeling "natural" to such sensations? It may be in certain cases due to painful experiences associated —either in the life of the individual or of the race —with certain objects which have this "feel." We might well say that the normal reaction of the nervous system upon certain kinds of skin-sensations is such as to produce a painful tone of feeling. Thus the fruits of ancient associations of the race have become organized, as it were, into the normal psycho-physical mechanism of the individual. On the other hand, we find not a few marked exceptions to those antipathies which most infants and adults customarily exhibit. And if either insensitiveness or curiosity accounts for the fact that some children enjoy handling snails, neither of these will readily account for the fact that some adults enjoy the smell of asafœtida or of burnt feathers.

In closing this chapter it is well again to remind ourselves how rich in content, and how influential over the entire psychical domain, is the affective side of human consciousness. In subsequent chapters the cognition of things and the development of the conception of Self will be seen to be dependent upon feeling. Psychology which neglects these phenomena, or gives them relatively little attention, or treats them only so far as they can be made the subjects of psycho-physical experiment, is not fitted to become the science of the artistic, moral, religious, and social soul of man.

An historical survey of the psychology of the affective aspects and development of man's mental life would be very instructive. It is undoubtedly our feelings that are of all conscious states, at the same time most fluctuating in the individual and most fundamental in social matters. We all find our own emotional experiences subject to grave and yet sudden changes; yet it is by virtue of these experiences that we are most intimately and complexly connected, as members of a race, with its development. Until comparatively recently, psychologists gave little attention to the systematic and detailed study of human feeling. Various reasons for this relative neglect might be assigned. Rousseau, the analyst of the heart, with his keen but morbid interest in his own emotions and sentiments, did much to awaken interest in the subject. Kant's espousal of the tripartite division of the soul's faculties, in spite of continuous efforts down to the present hour to overthrow it, has resisted the attempt to return to the overestimate which was laid upon "thought" by the psychology of Descartes and his followers. And if modern experimental psychology has met with little success here, and some of its most ardent advocates have done most to disparage and restrict the psychology of the feelings, modern biological science has had the reverse influence. It has emphasized and illustrated the truth that men differ less in the possession of certain passions, emotions, and sentiments, than in the character of their ideas and thoughts. The psychological interest in various forms of art, in social studies, and in the scientific study of insane or hypnotic emotional states, has laid bare the meagreness of the current psychology. It has made forever impossible the reduction of the phenomena of feeling, either to variations of intensity in the pleasure-pain series, or to the secondary results in consciousness of the fusion and association of ideas.

[Compare, Ladd: Psychology, Descriptive and Explanatory, pp. 162–210; Höffding: Outlines of Psychology, pp. 221–307; Baldwin: Feeling and Will, pp. 89–279; Bain: The Emotions and Will, pp. 1–68. Especially valuable monographs are Marshall: Pain, Pleasure, and Æsthetics; Stanley: Evolutionary Psychology of Feeling; Beaunis: Les Sensations internes; Bouillier: Du Plaisir et de la Douleur; Külpe: Zur Theorie d. sinnlichen Gefühle.]

CHAPTER VI

CONATION AND MOVEMENT

is obvious need of a word that shall stand for
l aspect or characteristic of all conscious states,—
ct which is neither sensation, with its objective
, nor feeling regarded as passive condition of
The word "Will" does not wholly satisfy the
For this word is surrounded with many preju-
nd willing is actually a very complex and highly
d kind of activity, whereas we are seeking a word
thing simple and primary. Recent writers on
gy have chosen the word "conation" to meet this
t may thus be said to stand for the "doing"
 all mental life.

Conation as Psychical Fact. — We must be content with recognition of the fact that all conscious states may, nay must, also be regarded as having in them the forthputting of the energy of the one subject of them all. This fact can only be recognized; it cannot be explained or reduced to greater simplicity. Conation — the word chosen to mark the *fact* — cannot be defined or rendered more intelligible by use of the most subtle and searching analysis. We must, however, be particularly on our guard against using this word for anything of a merely biological or physiological character. The psychologist means by conation to designate a *psychical*, not a merely physical fact. Physiology may, or may not, be justified in speaking of every amœba as having "a will of its own." The philosophy of Schopenhauer may, or may not, be justified in regarding Will as the "Ground" of the world; and theology, in regarding each man's will as the core of his personality. But psychology means by this word to designate a truth which is, primarily, neither physiological nor metaphysical, but psychological. It means to designate a primary and indubitable datum of consciousness. This datum may be expressed as follows: *All psychic life manifests itself to the subject of that life as being, in one of its fundamental aspects, his own spontaneous activity.* This fact (datum) is irreducible and beyond all dispute.

The use of the word "conation" in psychology is not without objections. Still we follow the better course in accepting it and confining its use to strictly psychological applications. As long ago as Aristotle the distinction between wholly "blind" appetencies and intelligent forthputtings of mind was recognized. Kant recognized "exertive or conative" power as involved in all psychic life. The English writer on ethics, Cudworth, in "A Treatise on Free Will," speaks of the "hegemonic of the soul" as it acquires increased control over the feelings "by conatives and endeavors." Hamilton adopted the word as covering both desire and volition. Sully says: "The most obvious common characteristic in this variety of actions or conative processes is that peculiar element which is best marked off as active consciousness." And Höffding speaks of the same thing under another term, when he declares: "We speak of volition whenever we are conscious of activity and are not merely receptive. But . . . we never are purely receptive." The common language testifies to the same experience when it speaks of "undergoing" suffering. *I undergo* the suffering — by "bracing up" against it and resisting it, or by striving to free myself from it and withdrawing attention from the painful object.

Kinds of Conation. — Strictly speaking, *there is only one sort of conation.* For this word marks the bare fact of the spontaneity of mind as entering into every phase and aspect of its own life. There are, however, an indefinite number of stages in the development of conative faculty, — all the way from blind, inchoate striving, through intelligent desire and effort after perceived or imagined ends, to deliberate and spiritual choice of the highest human ideals.

Moreover, conation is uniformly connected with two most important classes of effects. These are (1) the movements of the bodily members, and (2) the focusing and distribution of attention in the field of consciousness.

Physiological Conditions of Conation. — Even in the lowest forms of life it is not as yet possible to explain all movements as the result of irritating the peripheral parts with different forms of external stimuli. It is due to this fact that even the amœba has been said to have a "will of its own." In more complex animal structures, as the frog, for example, when the spinal cord is severed from its connection with the brain, the movements of the limbs as produced by the cord are still complicated, but are changed in character. They have lost the spontaneity, the uncertainty, and much of the variety, of the movements of the same limbs in the case of the uninjured frog. Such brainless movements are commonly said to be "reflex." If we leave the lower parts of the brain of the frog — the medulla and the optic lobes — attached to the cord, the movements of the mutilated animal become more complicated. When stroked, it will now croak with the regularity of a music-box; it will perform, in the most orthodox fashion, many remarkable feats in the coördination of its muscles. But, apparently, these movements are definite responses only to the changing quantities and places of application of the external stimulus. The movements of the full-brained frog are not thus definite, regular, and explicable as the effects of irritation from without. One can never tell whether it will leap or croak in response to a given stimulation; and if it leaps at all, one is doubtful as to the direction and amount of its movement.

This power of the central nervous masses to initiate movements which cannot be ascribed wholly to external stimulation is called "automatism." Physiological automatism is the physiological condition of the psychical fact called conation. In other words: *Automatic (or centrally initiated) nervous activity is the peculiar physiological correlate of active consciousness, of the conative element in all psychic life.* In man's case, it is apparently the automatism of the centres of the brain which furnishes the physical basis of his conscious life of volition. The proof of this conclusion, however, would take us too far into the details of physiological psychology.

Psychological Expression of Conative Consciousness. — I act and I know that I act — this as truly as I see, hear, feel pleasure or pain, and know that I have the sensations and am subject to the pleasure or pain. In the very seeing, hearing, feeling, and knowing of myself in these states, *I am active.* For psychology, active consciousness is identical with consciousness of activity. Hence the motto: "In Willing *we* work, but Wishes play *with* us." This factor of all conscious states is experienced as determining changes in the states immediately following.

anges of the relations of bodily members, and in v of ideas within the so-called "stream of con- ess," there is much which appears to be done *in* us, rather than *by* us. Thus one winds one's watch or quite unconsciously, and one is awakened to t that one has been winding it by the unpleasant ns which follow trying to keep on turning the en the watch is wound up. The educated physi- tomaton" will do a great many things for us better can do them for ourselves. But any turning of ntion from the train of thinking, in the conducting h *we* have previously been active, to the character of gs of the automaton, at once abolishes the train king and profoundly alters the motor activities. ter then become *our* doings, in a new meaning of rds. For example, one is thinking about one's matters with a direction of conscious attention to ness in hand; one comes to the door of one's study ends aimed at, be successful or not. "Hold still," the mother or nurse says to the restless child whom she is dressing; so the surgeon to the patient writhing under pain. "I am *trying to*" is the proper reply; and it matters not whether it be added — "but I *can't*, or "and I *will*."

Feeling of Effort. — It has been customary with some writers to make the consideration of the active side of consciousness depend too exclusively on the position taken with reference to the origin and character of the "feeling of effort." The reason for this is impressive and obvious enough. If I strive with all my might to move some heavy obstacle (and I can, of course, do this only as I am resisted), I have the most indubitable and intense conviction that *I am putting forth an immense amount of energy which is, in some peculiar way, my own.* A similar impression is unavoidable when I "try very hard" to attend to the minute details of some object of perception, or to think out a complicated and difficult problem.

Here we are reminded at once that this feeling of exerting force depends in a large degree upon our actual weakness rather than upon our actual strength. Experiment shows more precisely, the same thing which common experience clearly suggests, that fatigue, soreness, and inefficiency of the external mechanism, and a variety of other sensory conditions, in general increase this feeling of effort. The men of really strong wills, in the more perfect control of strong bodies, feel the outgoing of their strength little or not at all. This experience suggests the truth that it is the consciousness of the condition of the skin, muscles, joints, breathing apparatus, and vaso-motor processes, which determines the feeling of effort. In other words, tense skin, swelling and hardened muscles, tightened tendons, jaws set and hands clenched, or other joints pressed together, the increased laborious action of the heart, and the harder breathing, etc., are feel when we imagine ourselves to be doing a of willing.

many important elements of the so-called "feeling " are sensory and have a peripheral origin, there ger any doubt. Not a few writers now claim that elements of this impressive modification of conss, in which we seem to come to the fullest possiization of ourselves as active, are purely sensory sive. It is difficult to devise an experimental or determining how far, if at all, this feeling is nt upon centrally initiated and outgoing motor s. But a careful weighing of all the evidence to the following conclusions: (1) Physiologically ed, the feeling of effort is of a mixed origin. It dependent upon an increased molecular activity, r life," of the brain-centres which is centrally l; and partly upon the more intense and massive processes set up in the changed condition of the

the following: (1) From the earliest dawn to the latest development of mental life, it would appear that no *purely* "reflex" and no *purely* "automatic" nervous processes take place in the human brain. The two kinds of processes are ceaselessly conjoined; experiment can never wholly disentangle them. From the first, the brain is itself all alive, and yet responsive to sensory impressions coming from without. (2) Automatic activities with an outcome of movement undoubtedly take place in the brains of all the more highly organized animals. Preyer points out that even the embryonic child often moves under circumstances unfavorable to accounting for the movement as a result of sensory impulses. The crying, and kicking, and squirming, of the new-born infant seem to be, in part, the natural motor expression of its self-active nervous centres. (3) The sensory and motor elements, areas, and functions in the human brain cannot be kept apart. And to suppose that the processes which innervate the muscles have no correlate in consciousness is to go contrary to our most enlightened view of the whole field of physiological psychology. Thus much from the physiological point of view.

(4) There are various experimental proofs which favor the same conclusion as to the nature of the feeling of effort, psychologically considered: (*a*) The complex feeling of effort does not appear to run parallel in intensity with the actual movement accomplished by contracting the muscles, compressing the joints, etc. (*b*) Patients afflicted with paralysis of the periphery still have the feeling of effort in a manner to indicate that it is partially of a central origin. (*c*) The rapidity of certain minute voluntary adjustments, like those of the larynx in singing, seems to indicate that "the outgoing currents must be measured out in advance of our feeling of the effects." (*d*) Singers, with the sensitiveness of the larynx diminished or destroyed by cocaine, have still been able to sing correctly. (*e*) Baldwin's "discovery that right-handedness develops in infancy only under conditions of muscular effort" seems to favor this view. Its more obvious explanation is that a "vague consciousness of greater motor readiness," dependent upon the condition of the brain-centre, anticipates and guides the movement. (*f*) In judging the difference between movements willed and those actually executed we seem to be dependent on our estimate of the strength of the "impulse to action" rather than upon our estimate of the actual amount of movement of the active organ.

Conation and Movements. — Bodily movement and the focusing and distributing of attention are most closely

So close is the relation that some have claimed:
on acts only upon muscles and through muscles."
, indeed, reason to believe that the fixation of
is necessarily correlated with the irritation of
lled "striated" muscle-fibre. As attention wan-
is voluntarily redistributed, the particular mus-
oups of muscles irritated are constantly changing.
focusing and fixation and distribution of atten-
entical with a large part (if not with the whole)
nging life of conation. The one psycho-physical
of the greatest importance in this connection may
tated as follows: *All forms of sensory, emotional,*
tional excitement in the brain tend to overflow the
nd areas in which they originate, to flow down the
motor tracts, and thus to set in movement the dif-
rts of the motor apparatus.

of Movements. — The more elaborate classification
nents takes into account the development of all

intelligent or deliberate seeking of an end, we may speak of (4) *Impulsive movements.* But whenever the sensations, feelings, and resulting movements are related to an end connected with the preservation and propagation of the species, we call the movements (5) *Instinctive.* Such movements as emphasize the realization of some idea present in consciousness may then be called (6) *Ideo-motor.* A combination of the first three forms of excitement may result in complex and expressive coördinations of the muscles that are directed, not by any conscious idea, but according to a pattern set by some adult of the same species. These are commonly spoken of as (7) *Imitative movements.* In infants of a certain stage of development, smile answers in imitation of smile, frown of frown, grimace of grimace, etc. To the general principle of suggestion, as involved in such movements, we shall have need to recur again.

That "*every state of consciousness tends to realize itself in an appropriate muscular movement*" has been called a law of "mental dynamogenesis" by Féré, Baldwin, and others. This law is illustrated in the case of each of the classes of movements mentioned above. The human animal is not made to keep still; the human animal cannot keep still. Not to move in any manner, or in the slightest degree, is to undergo a temporary death. The embryo moves in the womb; the sleeping child rolls "aimlessly hither and thither when fast asleep." Every smell is a challenge to sniff the air into, or blow it out from, the nasal passages. Every taste provokes the tongue to try the substance by rolling it about. Strong pain throws men into convulsions; they leap and dance with intense rage or joy. In the insane asylum the patients afflicted with "depression of spirits" move slowly, or sink their heads upon their breast, let arms and legs lie flabby, or fall "all in a heap."

The fainter feelings and sensations provoke us to the movements which are necessary to define them more closely. Every vivid idea of doing anything produces a state of tension in the muscles needed for doing that thing; if it does not also throw them into a state of actual and obvious movement. The "ideo-motor" kinds of movement are innumerable; they are the movements which record the influences

on in the dreamer, in the hypnotic subject, and in the wak-
ies of daily life. Tell the person in a state of hypnosis that
ing ink instead of water and he begins to gag and spew
ely. But if he has the "idea" that he is drinking lemon-
d of vinegar, he smacks his lips accordingly. The child
l of its own muscles under influence from the same princi-
er affirms that he noticed a child of only fifteen weeks
attempts to purse the lips when I did it close in front of
e all tend to smile at others smiling; and sounds of weep-
that "woe" to which Thackeray makes reference in his
rossing the English Channel, are apt to elicit similar motor
n us.

pment of Motor Consciousness. — Certain psycho-
principles furnish conditions to the growth of the
xperience as connected with the control of the
ganism. The following three may be noted here:
principle of interference. Certain muscles and
ted groups of muscles cannot be moved simul-
y. When the sensations, feelings, or ideas, which

expressive of and obedient to his own conative consciousness, he could never arrive at a knowledge of things or attain a condition of mastery over them. We shall see later on that it is no more possible to explain perception by the senses without taking into account a *moving* eye and a *moving* hand, and, indeed, an entire equipment of *movable* organs, than it is to explain the same development as the result of impressions upon a passive *tabula rasa*. It is when we *will* the occurrence of changes in the parts of our own bodies, and through their movements effect changes in things, that we learn both to know our own bodies and things external to our bodies. The training of the life of bodily movements is, then, a most important part of education.

[The more advanced student of this subject should inform himself as to the phenomena of automatic reaction and reaction-time. See Ladd's Elements of Physiological Psychology, Part I, chaps. iv and vii, and Part II, chaps. i, ii, ix, and x. For the general phenomena of conation compare the Psychologies of James (II, xxvi), Höffding (vii, A and B), and Baldwin (II, xii–xv). Important monographs are the following: Spitta: Die Willensbestimmungen; Mach: Grundlinien d. Lehre von d. Bewegungsempfindungen; Münsterberg: Die Willenshandlung.]

CHAPTER VII

IDEATION

the later conscious states could, in some sort, t" or stand for the earlier, there could be no y or development to the mental life. A *stream* ousness cannot be a flow of disconnected and nt psychoses. The effects of previous experi- vitably show themselves in every new experi- wever original such experience may seem to be. memory of my own I have no past for myself; have no past for any one else unless it be in ry of this other one. But memory is correctly as *representative* faculty, *par excellence*. Neither question now be asked: How is the experience modified in character on the attempt being made to call it back? Plainly, it is not the *sensation* itself, or the *perception* itself, which is called back. It is a much modified mental process which answers this call. Instead of the sensation we have in consciousness the *idea of* the sensation; instead of the perceived object, we have the *image of* the object.

Here, as elsewhere, the popular (and even the so-called vulgar) use of words is most true to life, because fresh from a living experience. The usage of the people does not hesitate to say: "I have no idea how that rose smelled;" or, "I cannot get rid of the idea of that nasty-tasting beef." In such usage the word idea stands for a mental process which may be regarded as more or less faithfully reproducing some form of actual experience. When the complaint is made, "I have no idea" of the soul, or of God, this means that these objects are not representable in satisfactory terms of previous experiences.

An entirely fit word for the elementary representative process, regarded as a psychical product, will probably not be found. In Latin the noun *imago* might be applied to a "mask," an "apparition," a "ghost," or a "phantom." In all these cases it meant something which is recognizably *like*, but *really is not*, something else. This meaning adapts it admirably to several important aspects of the representative process. Yet the word "image" is most obviously fitted to express our experience with the eyes. We *see* images; but to speak of images of smell, taste, muscular, tactual, and joint sensations, seems inappropriate. It sounds odd also to refer to the image of the symphony heard last night.

Similar objections may be made to the word "idea," which is from a Greek word nearly equivalent to the Latin word *species*. These objections have to yield, however, to the psychologist's demand for some term which shall express the elementary process and product of *re*presentation — the bringing up in consciousness again of what has, *in some sort*, been there before. And the excellent suggestiveness of such derivatives as "ideation," "ideate," etc., is an additional advantage coming from the use of the word "idea."

nages. — In studying the nature of the idea and
ocess of ideation, it is well to begin with the
ıa of "after-images." The sensations of all the
senses show substantially the same phenomena;
sense of sight they are more obvious and more
lly studied. For example, let one look fixedly
lle or at a brightly colored spot, and then note
ws on closing the eyes. The immediate impres-
ch lingers an instant, will so closely resemble a
as respects intensity, life-likeness, and objective
that it seems more properly called an "after-
" It is indeed due to the lingering effect of the
timulation.

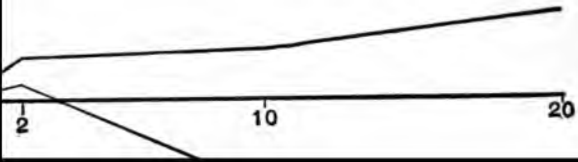
king the above experiment, the strongly sensuous
e soon begins to waver, to intermit, and finally
s. It is then difficult or impossible to force the
f anything *exactly like* it. Suppose, now, that
reproduce a concrete conscious state as *nearly*

shot, and if the question be asked not more than 2 sec. to 10 sec. after the event, it may be answered correctly. But if the memory-image has been fading for a longer time than this, it will probably be gone beyond recall.

Weber found that the primary image of weight sank so rapidly as to be almost gone in 10 sec.; and Lehmann found that a shade of gray could be recognized with certainty only so long as the interval did not exceed 60 sec. In testing his memory for "nonsense-syllables" another observer (Ebbinghaus) decided that after one hour half the original amount of work must be done in order to relearn a series, once learned before; after eight hours relearning required two-thirds of the original work. From these experiments this observer attempted to derive a law for the fading of the memory-image: "The ratio of what is forgotten to what is retained is inversely as the logarithm of the time."

On the other hand, the intensity and life-likeness of certain memory-images persist in consciousness to a remarkable degree, for an indefinite time. Dr. Moos tells of a patient whose acoustic images persisted with the vividness of sensations fifteen days after a musical *séance*. M. Baillarger, after working on brain preparations with a fine gauze over them, would for a long time see the image of the gauze covering other objects in the field of perception. Another worker in science, when walking the streets of Paris, frequently saw the images of the objects he had been working with, projected upon surrounding things.

Revival of the Memory-Image. — The laws of the revival of the memory-image are closely connected with the laws of its fading. Both are related to the psychology of voluntary recollection. In general we may say that the accuracy and certainty or definiteness of the revival of our representative images vary inversely as the amount of their fading. This subject admits of a certain degree of experimental determination. For example, suppose that one moves the arm through a definite space, and then, after a given time (10 sec.), tries to guide one's self by the memory-image of the muscular sensations so as to move the arm through exactly the same space. Repeated experiiows two results: (1) the idea of the distance has l; perhaps it will be made, on the average, only nths as much as it should be. But (2) the idea of tance has become fluctuating and uncertain; the vary considerably when compared among them- By carrying out the same method of experiment nger intervals (20 sec., a minute, etc.), the rela- etween the decreasing accuracy and definiteness of ival, on the one hand, and the increased fading of ntal image through lapse of time, on the other hand, investigated.



mental life of man. These laws have to do with the metabolism, cell-propagation, nutrition, and growth of the nervous system; and especially of the brain. There is, indeed, a mischievous fallacy, against which we shall enter our protest in discussing the nature of recollection, lurking in the phrase "organic memory." But there is also a most important and indubitable truth emphasized by this phrase. Every human brain has a history which is, figuratively speaking, written on it in characters of the impressions it has received and the uses to which it has been put. This history is formed under the principles of habit, growth, and tendency. What it has done, in the way of past reactions to external and internal stimuli, has grown into its very structure; this characteristic growth is the embodiment of its habits and the dictation of its tendencies. It may be still plastic. Indeed, to lose all plasticity would be to cease to live as a brain; but its habitual ways of behavior in the past give ever-increasingly strong conditions to its plasticity.

"Inorganic tendencies" of a molecular kind are familiar enough to physics as existing in all kinds of bodies. Even a good old Cremona violin "stores" in its structure, as a sort of inorganic memory, certain molecular alterations of its woody fibre. The practice of modern photography depends upon the fact that a plate of dry collodion, or other preparation, when exposed for an instant to rays of light, retains afterwards the effects of the changes thus produced in its minute particles. But these tendencies only faintly foreshadow those of which we find organic bodies capable. Every cell is an aggregate of particles which, in their chemical constitution, arrangements, and habits of reaction, retains its own past experience as a cell. And the cells propagated from it receive (or "inherit") its subtle and invisible tendencies.

But especially is the nervous system, and above all the human brain, a storehouse of tendencies, or "dynamical associations," dependent upon the previous history of all its elements in their manifold relations to each other. These elements, having acted together in a certain way, tend to act together in a similar way. In every portion "the whole curve slumbers." Now we know by experimental and other evidence, to which reference will be made later on, that the cortical centres concerned in sensation and in ideation are the same for the same objects. Hence is derived, as from our entire conception of the nature of the nervous mechanism, this principle: *The mechanism of representative images, as they occur and recur in connection with each other, has its physiological conditions in certain "dynamical associations" amongst the nervous elements of the brain-centres.*

Variable Characteristics of Ideas (Mental Images). — The different representative images differ among themselves in several important ways. Of these characteristic differences the more important may be summed up under three heads: (1) Intensity, (2) life-likeness, or "fulness of content," and (3) objectivity. By the first of these three characteristics is understood the sensuous vivacity of the idea; its pungency, so to speak, or ability to take command of the attention and force a focusing of attention upon itself. By the life-likeness of an idea is understood its ability to represent the original in all the concrete particulars which belong to that original. Life-like ideas are more content-full, less meagre and "schematic," than are those that lack life. By the objectivity of an idea is meant the amount of conscious reference which it carries, so to speak, to some actual experience, either with things or with ourselves, as furnishing the real basis of the process of representation. Thus we speak of *ideas of* real objects as distinguished from *mere* ideas. The distinction is, indeed, one of degrees — of amounts of objectivity. And it is the tone of feeling which fuses with the idea that largely determines the objectivity of any idea.

These three characteristics of ideas — intensity, life-likeness, objectivity — are closely related in every elaborate representative process. Ideas of very simple sensations, or of bodily feelings, by mere increase of intensity become objective, and so indistinguishable from sensations. But in the case of complex objects of perception or of self-consciousness, it is the amount of content which largely determines their likeness to life. A vivid idea of the cut of a knife may become a localized bodily pain as if one were being really cut with a knife. But an idea of a dead or absent friend would have to possess something more than mere vividness to seem *like* that friend; it would have to possess richness of content.

Intensity of Ideas. — Some distinguished psychologists have denied that ideas have intensity. Others have made their chief or only point of difference from sensations and perceptions a "fainter" degree of intensity. Both opinions are clearly wrong.

Thus Lotze maintains that "the idea of the brightest radiance does not shine, that of the intensest noise does not sound, that of the greatest torture produces no pain," etc. And Ziehen declares: "The ideas of the slightest rustling and of the loudest thunder exhibit no difference in intensity whatever." These sentences involve a curious and even absurd misapprehension. From the psychologist's point of view we might as well say that the *sensation* of brightness does not shine, etc. Surely the sensation "*of* green" is not to be called a *green* sensation, any more than the idea "*of* blue" is to be called a *blue* idea. But surely also the idea of the *bright* sun, if it is truly a "representative" idea, differs intensively from the idea of *faintest* dawn — differs, that is, in some way which stands for a difference in amount of light-qualification, — in the intensity of psychic energy corresponding to the idea.

The misapprehension just noticed may be corrected by calling attention to the important distinction between "thinking about" things and "calling up ideas" of things. I may think about whispers and thunder, and about sun and candle, without being conscious of any even faintly sounding image of whisper or of thunder, or faintly glowing image of sun or of candle. But even this absence of intensive qualification will usually be found to involve the fact that the actual representative content of consciousness does not, in such a case, consist of similar acoustic l images at all. In such cases the actual stream iousness is probably a train of thought supported cession of words.

inly it is not every one that can visualize the idea un so intensely as actually to see its disk in a ison, as Benvenuto Cellini did. Nor can every l the English painter who could paint a portrait e mental image of the subject placed before his eye" in a real chair. But every one's experience ion is governed by the same two general princi-) Similar activities of the organism are called out, usually in a fainter degree, by the original sensa- perception, and by the representative process for rticular sensation or perception. (2) Although t individuals differ widely in respect of their tative processes, and these processes differ greatly hemselves, they all have some degree of intensity. the intensity qualification of the idea or mental appropriate sensations and movements. Thus the dreamer who imagined that a stake was being driven through his foot by burglars, in order to account for the sensation of a feather between his toes, saw the burglars, felt their tortures, and struggled with them, as clearly and as mightily as though his perceptions had been "real."

Life-likeness of Ideas. — Strictly speaking, we rarely or never have an idea of a simple sensation or feeling or volition, as such. Hence Dr. Ward is probably right in the opinion that a simple visual or tactual experience (redness or softness) cannot be reproduced in imagination. We ideate perceptions and not unlocalized sensations or abstract and disconnected movements; we have representative images of things seen or felt. For this reason the ideas of things differ from the things as perceived, in other respects than in mere intensity of the process of presentation. *Re*presentative images are not experienced as *merely* fainter copies of the original experiences. One most important difference between the two is that things perceived have a rich and full content, but ideas of things are comparatively poor and meagre in content. And if we try to render the content of our ideas richer and fuller, we have to take time and call up their different features one after the other. How different this poverty and fluctuating character of detail from that immediately present wealth of detail with which the eye, and even the hand and the ear, give us their objects! If the objects to be ideated are our own experiences, the case is not greatly different. We can *live through*, in five minutes, more than it takes us almost as many hours to reproduce in a succession of memory-images. *The "life-likeness" of the idea is therefore dependent upon its possessing a richness of content corresponding to its original; and that idea is the most "lifelike" representative of any experience which most nearly reproduces the complex characteristics of its original.*

vity of Ideas. — Different ideas differ greatly in
which they enforce upon the mind to refer them
rld of real existences. Some ideas surely repre-
al occurrences; others, equally surely, must be
as mere products of fancy. Still others we are
about; one cannot always tell whether one re-
or imagines some particular thing. There are
s which represent entities that no eye has ever
and handled, but about the reality — the objective
— of which, there may be little or no doubt.
the chemist, are his ideas of atoms and chemical
uch, for the biologist, is his theory of evolution,
story of the changes that have gone on in some
hich has become visible only when it has arrived
velopment.

nsiderations which influence the mind in making
ective reference" for some ideas, and denying it
ideas, are so many and are so much a matter of

always a complex conscious process, partly like and partly unlike some original conscious process. (3) The so-called idea of any past feeling always has an accompaniment of feeling similar to the original feeling.

What happens, then, when we remember or imagine (have an "idea of") some particular affective experience is this: the perceptions, thoughts, reasonings, actions, etc., which constituted the original intellectual aspects of the experience are ideated, and a similar excitement of feeling accompanies the ideating process. Strictly speaking, then, *The "idea of a feeling" consists of the representative image of the original sensational and intellectual accompaniment or cause of the feeling, suffused with a revival — usually in fainter degree — of an affective condition similar to the original feeling.*

For example, we cannot have the idea of "how-it-hurt" us to have that particular tooth pulled, without picturing to ourselves the tooth as localized by sensations of touch, — and probably also many of the external details (dentist with forceps in hand, chair, etc.), — and then feeling over again a much fainter but similarly localized pain. We can "think about," how we had that particular tooth out, etc., and perhaps escape any revived idea of how we felt. But the idea of the feeling can be recalled only by an accompaniment of revived similar feeling. *Only emotion can represent past emotion.*

The Process of Ideation. — Not only is it true that our representative consciousness is not confined to the so-called idea of a simple sensation, but it is also true that ideas do not occur singly in consciousness. Representative images obviously have a certain complexity which may be figuratively spoken of as the result of a "fusion"; they ordinarily occur also in trains, or successions, of greater or smaller extension. This means that the complex process of ideation continues in the stream of consciousness; and that those successive parts of it which discriminating attention can grasp together as ideation-states are dependently conogether. Once started, we keep on ideating for a fraction of a minute. *The process of ideation is ly a succession of ideas.*

general truths, which apply to the entire mental st be appealed to in every attempt to account for inuous and connected process of ideation. These following: (1) *The circuit of every field of con-ss is made by the very nature of mental life a limited* Not more than so many ideas, nor more than so mplexity of any one idea, can come within the f one consciousness, even in the best estate of psychical energy. (2) *All the partial ideation- have a modifying influence upon each other in the n of the complex and continuous process of ideation.* nciple of relativity, in an active and effective applies to all the objects in any one field of sness, to all the factors in any one mental state. lows from the two foregoing principles that every each other, to facilitate the development of mental life. But the development of that life includes activities far other and higher than those provided for in terms of association. Nor is association itself ever merely passive. For in representation, *the total character of every psychosis is the result of a spontaneous selective process, under the laws of that unity of consciousness which the very terms "state" or "field" of consciousness signify.*

Spontaneity of Ideas. — By the phrase "spontaneity of ideas," we mean to teach, in a figurative way, this important truth: *Every ideation-process tends to recur in consciousness, if no other interests prevent; and the strength of this tendency depends upon a variety of considerations which may be investigated.* "Suggestion" of one idea by another is scarcely, then, to be spoken of as the primary thing. Intense, lifelike ideas, that stand for realities in which we have an absorbing interest, especially when they have been frequently and recently repeated, tend strongly to recur in the stream of consciousness. They do not need to be suggested. They arise, delightfully or frightfully fresh and strong, and dominating attention in a way to emphasize their own vitality. They keep recurring, "of themselves." Such experiences seem better accounted for by a theory of the spontaneity of ideation processes, under the two general laws of mental life given above (p. 136), than by any theories of "suggestion" or "association," properly so-called.

Thus the idea of his mistress perpetually recurs in the lover's mind; the idea of the sick child in the mind of the mother; the idea of the departed friend in the mind of the survivor. Thus, in times of commercial panic, bankers and merchants cannot keep out of their minds the idea of business; in times of political or religious excitement it seems as though ideas of the appropriate kind were impregnating the very air. At other times mere random excitement of brain and mind seems to render all manner of rubbishing ideas endowed with a supernatural spontaneity. The ideation-processes "go wild." The successive fields of consciousness seem to be filled full of a hurly-burly of conflicting ideas that, without suggestion or reason, have "of themselves" broken forth to struggle or to sport together in the stream of consciousness.

Fusion of Ideas. — The claim has already been established that the more complex and continuous processes of ideation must be explained by the relative interaction of numerous simpler, partial processes. This result may be considered under the term, the "fusion of ideas." Fusion takes place whenever a number of mental images — either (1) homogeneous (like) or (2) heterogeneous (unlike) — have become so connected together as to be simultaneously reproduced in the unity of one field of consciousness. Examples of homogeneous fusion occur in the case of all complex perceptions by any one of our senses. Thus the idea of an extended visual body implies a "solidification" into a mental unity of several representative processes that have their origin in sensations of color and light, and in muscular and tactual sensations. The idea of an extended tangible body is a fusion of ideas of temperature and pressure sensations.

Heterogeneous mental images become fused so as to recur in the most whimsical and unnatural combinations in the unity of a single reproductive process. Thus one learned man, who had committed to memory certain passages from books which he read while running errands, could never afterward recall the contents of these books without their being accompanied by the flitting images of the palisades and hedges by which he had run while reading. Another, who had worked as apprentice for a hatter, could never see black wainscoting (like that of his workshop) without at the same time smelling the varnish used in his former trade. The learned Maimon always accompanied strenuous mental effort with the same "Talmudic intoning and movement of the body" with which he had mastered the writings of the synagogue. All mental life thus has its nonsensical side.

To speak of such close and inseparable connection of partial processes of ideation as a "suggestion of ideas," seems to us no more appropriate than it would be to say that sensations of temperature "suggest" those of pressure, or the reverse, when I perceive with my hand the coolness and smoothness of a marble slab. In this case, sensations of temperature and of pressure fuse in that complex conscious state which, as involving other mental operations to be dealt with subsequently, we call the perception of something "cool-and-smooth." When, then, the complex idea of such an object recurs in consciousness, the word "fusion" seems still the most appropriate term to express the resultant of the several partial ideation-processes. In neither case, however, is this word to be understood in such manner as to impair the unity of the conscious state. Undoubtedly a similar principle extends far on into the higher developments of mental life. When, for example, the child cries because his mother *suggests* sending for the doctor, the term "suggests" serves well enough to point out the relation which exists between hearing the word and the complex memory-image that arises in the child's mind. But why should we adopt the clumsy expedient of saying that the word doctor suggests saddlebags, and saddlebags suggests medicine, and medicine suggests nasty tastes; and so on? The child's very *idea of the doctor* is just this fused complex reproductive process, answering to the terms — a nasty-tasting — medicine-man — with — saddlebags.

Conflict of Ideas. — The process of ideation does not always, by any means, run smoothly forward. We are sometimes made painfully aware of this fact. It seems as though we could not *realize* the right and satisfactory process, because the tendencies to form partial processes which will not come together in the unity of a conscious state are so strongly felt. This experience of our ideating activity, with its characteristic tone of feeling, may be spoken of as a "struggle" or "conflict" of ideas. It is scarcely necessary in this connection to utter again the warning against regarding the ideas as entities that can "inhibit," "conflict with," and "overcome" or "destroy" each other. But we have here a frequent experience, which needs to be recognized and, if possible, accounted for. Nor is the account difficult to give. As experience becomes

plex, there is no single process of ideation which
ccurred, in slightly modified form, in connection
considerable variety of particular experiences.
particular tendencies to fusion, and the corre-
suggestions of every process of ideation, are
s, not to say innumerable. But the principles
mit the total stream of consciousness, as well
particular portion of that stream, do not permit
tendencies to prevail. Moreover, if the complex
ch is to occupy the central part of any field of
sness is a memory picture, it must resemble its
Even in the indulgence of the wildest fancy,
t of the ideation process must be somewhat like
real in fact. Definite forms of fusion, to the
of others, must then prevail; particular ideas
suggested, to the partial or total suppression of
s.

ay get a lively experience in the "reciprocal limi-

The succession of these states in time involves — or rather, it *is* — the entire knowable being and history of our mental life.

Ideating processes are, however, a most important part of the life of the mind; and the laws of their connection and sequence (the laws of "suggestion" or "association" of ideas) are of the greatest interest to the psychologist. In studying these laws two truths are of value in a preliminary way: (1) The succession of ideas is relatively "free." *We* cannot directly determine by mental habit, or temporary mood, or sudden feeling, or choice, what the succession of perceptions shall be. But the succession of our own ideas is obviously, to a much larger extent, a *matter of our own choice* or state of mind. This is true, in a limited way, of memory; but it is, above all, in fancy, that we are free. (2) Observation and experiment show that the succession of ideas is not free in the sense that sequent ideas are not dependent, both for their occurring and for their character, upon preceding ideas. The succession of ideas is limited and determined by something other than merely our feeling or our choice. If the idea **A** occurs in consciousness, it is not an even thing whether **B** or **N** will follow; neither is the appearance of **M** without the expectation, not to say certainty, that **N** will appear next rather than **B**.

One fact of experience which expresses the truth of the second statement just made, while leaving room for the undoubted truth of the first statement, is the following: *Not only single impressions, but successions of impressions, tend to be reproduced in a manner similar to the original impressions; and the reproduction of the time-order is a result of the general disposition to reproduce.*

Association of Ideas in Series. — The simplest cases of association best illustrate the foregoing principle of all association of ideas. Such cases are frequent enough,

lie at the very base of early education, since all
training and development of mental faculty
the repeated production of similar psychical pro-
similar sequence of time. It is thus that children
walk, to talk, to sing, and to use their senses
erception of things, and their powers of mem-
gination, and thought. In the same way every
asters the mere routine of his past impressions,
es them for future usefulness. Mention any par-
etter in the alphabet, and the succession of letters
in idea, in the original order of learning the
. *A* suggests *B*, *C*, *D*, and *L* suggests *M*, *N*,
The first tones of "Old Hundred," or of any
miliar hymn, draw the succeeding tones almost
ly after them. To sing it backward is well-nigh
le, although this particular tune is about as good
hen sung in reverse order as in the order which
ixed when it was learned.

their original order. The grasp of consciousness is necessarily limited; hence the necessity of condensing the series of ideating processes by dropping out unimportant members of it as originally required. This process of condensation is preparatory to the formation of conceptions and to the use of words as the "bearers" or "vehicles" of the condensed series of ideas. Thus *A*, *B*, *C*, comes to stand for the entire alphabet. "From A to Ω" may do well enough for all that lies between, if only a vague feeling of some content intervenes. In this way we form the idea of a familiar stretch of scenery, of a journey we have taken, of a long passage from some favorite author, or of an entire musical aria. The scenery contained these three or four notable memory-pictures; the journey was that one from New York to London when the two days of rough weather occurred; the passage is the one beginning thus and ending so; the aria has such snatches of melody, which we repeat in idea. Modern Japanese has one word compounded out of the first syllables of the three principal cities (Kyoto, Osaka, and Tokyo) of Japan.

Very important in this connection is it to emphasize again the nature of the grasp of consciousness. Thus Cattell found that three times as many letters, when connected into words as when disconnected, could be apprehended in one field of consciousness. And Ebbinghaus found that one-tenth as much work would suffice to learn the same number of syllables when making sense (capable of being ideated in condensed form) as was needed for mere non-sense syllables. A close watch upon ourselves will disclose the truth that, even when we are listening most intently and, as we say, "taking in every word," we really form only a very limited number of ideas to stand for the entire series of experiences. We conclude then: *Some of the members of any series come to stand as repre-*

ideas, not only for their own originals, but also for f the contiguous members of the original series; and rdinate members of the series take the part of faint at parasitical) "fringes" of ideation for the empha- as.

ple of Contiguity. — The one principle under which of association of ideas fall may now be announced. een implied in all that has already been said about cess of ideation; and, indeed, about the funda- nature of mental life. It may be called "the le of Contiguity," and may be stated in the follow- : *Associated ideas reappear as contiguous states of sness (are associated) because they represent pro- at were, with varying degrees of intensity and in rms of relationship, originally contiguous processes.* *sychical* character of this "contiguity" which fur- he basis of association in idea cannot be over- zed. The time or space or other relations in

Ordinary cases of association by (1) contiguity in *space* and *time* easily fall under this general law. As has already been said, things that are together in space, and events actually contiguous in time, never become associated unless they have become mentally united — perceived or thought of as contiguous. But in every complex act of perception or analytic activity of thought, attention and discrimination are preparing the material for a variety of possible ideal associations.

(2) Cases of *means* suggesting *ends*, of *causes* suggesting *effects*, of *signs* suggesting *things signified*, and the reverse, are also not difficult to account for under the same principle. The sight of the poker suggests the idea of poking the fire; or the sight of a poorly burning fire suggests the idea of the needed poker. Oiled rags, and unignited matches near by, suggest a train of ideas that move along the line of cause and effect. Both cases rest upon previous connections of conscious states of perception or of thoughts about things that embody the results of the actual experience of other men.

(3) So-called association by *contrast* illustrates the same principle. In acquiring our perceptions, and in thinking about objects, we must discriminate opposites — the contrasted qualities and actions of things. Thus the very process of acquiring brings the contrasted things and qualities into a unity within the life of the conscious mind. The original contiguity in consciousness accounts for the contiguity or association which the contrasted ideas of things and of their qualities have. The passage from light to darkness, from joy to sorrow, etc., is an impressive experience. The ideas of light and darkness, of joy and sorrow, thus acquire power to suggest each other.

(4) What is called association by *similarity* is, indeed, one of the most extended and fundamental of the

primary intellection and presentative experience
y. It is for this reason that our ideas of the
become associated. All conscious processes —
e discrimination, the formation of complex sen-
our experiences with compound forms of feel-
l the formation of complex ideas by the fusion
ler ideas — involve the distinction of like from
and the assimilation of the like. But this ex-
, instead of being something different from the
e of contiguity in consciousness, is precisely this
nciple in action, as it were. To maintain a theory
iation of ideas by similarity as something different
e principle of contiguity, rests then upon a con-
Those laws of mental life which regulate discrimi-
onsciousness in acquiring the original presentations
be confounded with those other laws which regulate
anism of the reproduced and associated ideas. The
re primitive, the latter derived.

generalization that has maintained itself as the strongest rival of the principle which we adopt. The acute psychologist Höffding has even taken the position that so far from association by similarity being resolvable into association by contiguity, every association by contiguity, on the contrary, presupposes an association by similarity, or at least an immediate recognition of similarity. Now the latter part of this statement of Höffding is true if only we strike out certain words, change others, and make it read as follows: "Some" (not "every") "association by contiguity presupposes . . . an immediate recognition" of similarity. This virtually admits the principle for which we are contending; namely, that the laws which regulate the succession of associated ideas are a derivative of the laws which regulate the binding together of elements and objects into the unity of one field of consciousness.

We may understand the truth of experience better by analyzing briefly an example. Let us take the one selected by Höffding himself as illustrating "the innermost germ of the association of all ideas." I see an apple on the table before me and quickly find myself thinking of Adam and Eve. Undoubtedly this is because, as Höffding says, I have — though so quickly as to be hardly "conscious of it" — had the idea of the apple on the tree of knowledge. But the explanation does not consist in the bare similarity of the two ideas as such. The train of ideas does not run thus because the apple on the table, being in idea *similar* to the apple in the Garden of Eden, has suggested the latter, and this latter has then suggested Adam and Eve. [Surely the latter case of suggestion is not easily explained by similarity of ideas.] On the contrary, the sight of an apple and its name have long ago so been bound together, by being repeatedly grasped together in consciousness, as to constitute a process of immediate recognition. The idea of an apple has also, by reading or hearing the Biblical story, been often brought into close mental contiguity with the ideas of the tree in the Garden of Eden, and so of Adam and Eve. It is because of these processes of previous recognition, due to a variety of causes, and not because of any special power of like ideas to suggest like, that the idea of Adam and Eve follows the idea of the Garden of Eden, which idea was itself suggested by sight of the apple.

Indeed, Höffding virtually admits the insufficiency of his analysis when he proceeds to maintain that the "two laws may be brought under one and the same fundamental law." This law he awkwardly calls "the law of totality," and ascribes it to "the synthetic activity of consciousness." But this is to adopt our principle.

ary Laws of Association. — Particular cases of the
on of ideas are found to require a variety of con-
ns for their satisfactory solution. Indeed, one's
ons of ideas embody pretty much all of one's past
ce. So that the answer to the question, Why
just now this particular idea rather than some
ay have to be sought at the roots and all along
urer growths of my entire mental life.

g the more prominent reasons for particular asso-
of ideas the following may be noted: (A) The
nature or constitution of the mind. Certain
l" tendencies, which powerfully influence the
acquisitions of the mind, extend themselves to
esses representative of these originals. Hence
persons differ in respect of the association of
ecause of (B) *temperament*, sex, race, age, etc.
e, sentimental, and phlegmatic men differ in the
d character of their mental train. Vague long-

But, finally, (F) *repetition* and habit are of the very highest importance in the mechanism of ideas, as they are in the explanation of all our mental life.

Interesting illustrations of most of these secondary laws of association are furnished by the results of Dr. Scripture in his experimental investigation of the "Associative Course of the Ideas." Thus a Japanese, on being shown a red light, after experiencing an agreeable feeling and uttering an exclamation of pleasure, had the mental picture of the sun and then of the Japanese flag (which has a sun on it). Another observer, on touching leather, had at once the visual image of yellow chamois skin and of men whom he had seen selling it but two weeks previously. Still another, on hearing the sound of a rolling ball, had the experience of an unstable mental image which defined itself as that of a marble rolling over a board (an African sport). A fourth observer, on being shown the picture of a brown bear, imagined a scene in which men were being dragged off by Polar bears, as in a narrative which he had read four years ago.

"Freeing" of the Ideas. — For purposes of recognition, and as motives to immediate action, there is a certain great advantage belonging to the most intense, life-like, and objective of our representative states. But for purposes of what is called "abstract" thought and of language, another sort of advantage must be acquired by these states. When vivid, life-like, and capable of easy objective reference, our ideas are most like our concrete states of sensation and perception. But they are then capable only of *representing* a very limited number of the objects of our sense-perception. If, for example, I examine most minutely a single flower, and thus carry away a detailed and accurate picture of that particular flower, this picture will not do to represent some other flower, even of the same species.

A process sometimes called that of "freeing the ideas" must then take place, if we are to be able to picture classes of objects. Such a process will involve these two connected phases: (1) The individual complex ideas (or ideating processes), by losing more and more of those factors which were given to them by previous experiences, become capable of representing a larger number of experiences that are similar only in respect of a smaller number of characteristics. The ideas are thus "set free" to represent a larger number of somewhat less similar individuals. (2) These same ideas, by losing the fixity of position which they had in a small number of series, become capable of association with a larger number of ideas to form new combinations and new series. They are thus "set free" to enter into a larger number of combinations.

It seems, then, that *the less vivid and lifelike any idea is, as compared with any single presentative object, the more service it can do in representing an entire class of objects.*

Schematizing of Ideas. — Substantially the same changes in the processes of ideation may be described as the progressive "schematizing" of our representative images. As the application of ideas to the development of knowledge widens, the factors which can become fused in any complex idea, and so made to stand for an entire class of objects are reduced in number. The unessential or relatively useless factors are dropped out; the few essential or relatively most useful factors are retained. The rude drawings of primitive peoples, the origins of the different alphabets, the gruntings and gesturings with which savages help out their meagre language, the use of signs in mathematics, illustrate the same psychological truth. The *schema*, or "sketching" idea, does the work of a long series of more lifelike ideas.

In this same development the superior *objective* qualities of the ideas of sight and touch become apparent. One can picture schematically to one's self a heliotrope or a Japanese lily in terms of sight; but the *schema* of the smell of either of these classes of flowers is much more evanescent. Solid and real things require schematic reproduction in terms of the tactual and muscular experience. In general, *the more "abstract" the ideas derived from our presentations of sense become, the more do they consist of highly schematized images in terms of sight and touch.* But these classes of ideas belong to the more intellectual and objective of the senses.

A correspondent of Galton, on closing his eyes, habitually saw arise before him a series of concrete visual images, of which he seemed to be only the passive spectator; for example, a bow — an arrow — hands drawing the bow — a cloud of arrows — falling stars — flakes of snow — ground covered with snow, etc. Compare *this experience* with what goes on in the consciousness of the average reader of the *words describing* the experience. How lifelike but limited the one associated series! how abstract but free in association, the other!

Plan in All Ideation. — The earlier processes of ideation seem peculiarly mechanical in character. They therefore lend themselves easily to experiment and to the more mechanical theories of the mental life and mental development. But clear traces early appear of something, even in the process of ideation itself, which oversteps the bounds of mere mechanism. The beginnings of an organization of experience are, indeed, largely passive. But we have already seen that attentive and discriminating consciousness, as announcing the presence of activities which will develop into faculties of judgment and will, are everywhere present. So in the formation and control of associations among the ideas, the conscious desires, choices, and rational judgments of the mind, will come more and more into evidence. The systematic and purposeful character of the dominant associations, and not merely the dominance of the systems of associated ideas, will be established. The mind will appear less as the nd victim, and more as the creator and master of deas.

ern psychology, the Herbartians in Germany and the writ- Associational School in Great Britain have been prolific of n this subject. To these treatises general reference may be e experimental treatment of the fundamental phenomena y Scripture: The New Psychology, Part II, "Time," espe- . xiii. Monographs may be consulted, by Hering: Ueber tniss, etc.; Uphues: Ueber die Erinnerung; Ebbinghaus: Gedächtniss; Stricker: Studien über d. Association d. Vor- ; Binet: La Psychologie du Raisonnement; Ferri: La Psy- l'Association; and Nichols: Memory.]

PART SECOND

THE DEVELOPMENT OF MENTAL LIFE

CHAPTER VIII

IMPULSE, INSTINCT, AND DESIRE

We have now completed the preliminary survey of those elementary mental processes which enter, as factors or constituents, into every conscious state of the adult mind. These processes are what we discover when we direct our attention, in the way of searching *analysis*, upon the varying aspects of the stream of consciousness. It is by their growth, in varying degrees and modes of *synthesis*, that the formation of "faculties" and the development of the entire mental life is explained. Sensation, feeling, conation with its accompanying movements, and the processes of representative image-making; and over all, and in all, attentive and discriminating recognition of the like and the unlike;—these are the transactions which are ceaselessly going on in the conscious Mind.

It would be a mistake, however, to suppose that mental growth can be explained, or even described, as *mere* combination of these elementary mental processes. It will soon appear that certain principles must be recognized which, as it were, lie deeper down in the constitution of the one subject of all conscious states. But it is substantially true of all developments, that the factors which enter into them do not account for their own existence or for their modes of combination. Preëminently is it true of the mind that It grows according to ideas (a "plan"), not by any means consciously recognized as the its own pursuit and choice. Mental life runs vhich is *sui generis*, and which is regulated by s own, in the following of a purposeful order,— lled "nature" or "constitution" of a human

he more epoch-making stages of mental develop- at appear as wonderful new faculties manifest s. We shall see this to be true of perception ve cognition, of ideation as recognitive memory, fic acquisition, and of freedom in self-control. me time, it remains true that it is by the com- of the elementary processes, in ever-increasing y, up to the limit of complete development, that tion of faculty and the attainment of "Mind," in eaning of the word, are to be explained.

w turn to the work of tracing the development to man as made for action. They equip him for, and propel him toward, the doing of something in the attainment of ends. But the growth of experience consists partly in learning the proper inhibitions to impulsive movements, as well as in learning the proper movements to satisfy the impulses. Moreover, those forms of feeling in which the movements take their rise, and the resulting movements or inhibitions of movements, are all too customarily tinged with a decided coloring of pleasure-pain. This may be illustrated by a simple reference to the stock example of the child that impulsively reaches for the candle, gratifies its impulse to touch the flame, and receives for the future an inhibitory memory-image stamped into the very organism with the sharpness of its pains.

Various classes of appetitive states of consciousness have been recognized by psychologists, and a variety of terms employed for them. But it is not necessary to enter into details in order to understand this side of mental development. In describing briefly the three prominent, yet related, forms of "appetition," the following remarks are pertinent: (1) In no case does psychology intend to treat of the unconscious or *merely* reflex and automatic combinations of the motor organism. The words "impulsive" and "instinctive," when used to designate such combinations, are of physiological and not psychological significance. The psychologist deals with impulse and instinct, as well as desire, only when they become *conscious states.* (2) Impulse, instinct, and desire, considered as psychoses, are terms which may be applied to explain a great variety of bodily movements. There is often much doubt which of these three words best describes the kind of consciousness that goes with a particular variety of movements. Yet when more carefully considered, each of the three seems to emphasize a somewhat different aspect of similar complex conscious states.

of Impulse. — The psychological conception of
may be defined as follows: *a conation, initiated*
with a feeling of craving, in view of some object
erception or imagination, with a tendency to dis-
a complicated form of purposeful movements. The
lays emphasis upon the *impelling* power of such
ll volitions as have reference to the attainment
nd. This end itself, however, may be only very
perceived, and not at all reflectively and deliber-
sen. The infant kicks, strikes, bites, clutches
hands, makes its first efforts at creeping and
— so far as all this is not a matter of pure physical
m, — "impulsively." In much the same way (in
fashion) the trained athlete performs his feats,
thrusts and parries, the thinker seizes and fol-
mental clue. In similar fashion do men and
ll in love and pursue the object of their passion;
glow with excitement, hew their way or lead

suit of ethical and æsthetical ideals, which strengthens, refines, and elevates this system of inhibitions.

Physiologically expressed, it may be said that the power of inhibiting impulses implies a reserve of nerve-energy in the higher psychic centres of the brain. When this reserve is wanting, the control of these centres over the lower parts of the nervous mechanism is weak and insufficient; the discharges from the lower centres are too prompt and explosive, as it were. Psychologically considered, we notice in persons of *over-impulsive* characteristics that they lack reserve in expressive action and in movements designed for the immediate satisfaction of excited sense or feeling. Various forms of mania are characterized in this way. The dipsomaniac drinks impulsively; the kleptomaniac steals impulsively; the planomaniac wanders off impulsively; the erotomaniac gratifies sexual passion impulsively.

Development of Impulse. — There are two sets of considerations which, by their mutual action, determine the development of the mind in its impulsive states of consciousness. First, the impulses themselves tend to become more numerous and complicated as intellectual development proceeds. We are accustomed to think of the child as preëminently the creature of impulse. It is true that the power of impulse is relatively large in its case; and that the area in its consciousness given to movements prompted by craving and going out toward ill-defined ends, is the more extensive. But the result of experience itself is to uncover and multiply other and more complicated forms of impulse.

But, second, the very conditions of mental development are such as to reduce the various impulses to some sort of unity. What is called "conflict of impulses" very early develops. The fierceness and the complications of such a conflict increase, within certain limits, as experience expands and hardens; that is, with the development of mental life. Two modifying results must, therefore, be secured: (1) Certain impulses become dominant; they attain the position of habitual exciters and controllers of

res of action belonging to them. This secures a
“consolidation” of impulsive movements. The
ts lose their earlier more random and purely
c character; they become habitually adapted to
zation of the dominant impulses. (2) At the
ne, deliberation and rational regard for conse-
conduce to the control, in the interests of more
nds, of the mental appetencies. For example,
rmed dipsomaniac is under the dominant impulse
y the craving for drink, while the child is swayed
nstant change of appetencies. But the adult
l will delay the gratification of the one impulse
plan ways to escape its more disagreeable conse-
as the child will not in the case of any one of its
s impulses.

petites. — The three forms of appetite popularly
d may be considered as impulses which develop
l in all human beings, on a basis of special physio-

opment of mental life, and under the influence of a great variety of domestic, social, and more distinctly legal influences. Its beginnings manifest themselves sometimes as a matter of feeling gentle repulsions, or "shyness," sometimes in the form of vaguer or more definite attractions mingled with curiosity, desire of approbation, and undefined cravings. While it is probably never wholly free from admixture of elements due to the difference in the bodily organism of the two sexes, it is also seldom sunk so low as to be a mere physical impulse dissociated from ethical or æsthetical significance in the estimate of the mind which feels it.

Impulses from the Emotions. — Each of those forms of intense feeling which we call "emotions" has its characteristic, correlated impulse. The impulse of anger is to strike, or kick, or resist in some way. "Love," says Bain, "is completed and satisfied with an embrace." The impulse of fear is to run away, or to assume an attitude of defence rather than of attack, as in the case of anger. When the feelings of curiosity, doubt, or belief, reach an emotional stage, they manifest appropriate impulsive and purposeful movements. Curiosity *impels* us to look attentively, doubt to look suspiciously, and belief to look confidingly, at its object. These "innate" impulses, as they are sometimes called, are restrained in the interests of habitually or deliberately chosen ends. But the restraint itself is inevitably connected with a feeling of tension which is highly significant of the explosive condition of the motor organism.

Nature of Instinct. — Few words have been employed with more pardonable indefiniteness, and even ignorance as to what really corresponds to them, than the word "instinct." By common agreement, however, the instincts are thought to have their origin for the individual in certain impulsive forms of feeling, which set a mechandy prepared for them, as it were, into movement poseful way. Thus far instincts and impulses in their psychological origin and psychical char- he proper restriction of the word "instinct" e made, it seems to us, in connection with the of the *species*. By instincts, then, we under- *ch impulsive activities as belong to all the members s, and thus exhibit themselves, either at particular r uniformly, in the development of the individual ber of the species, or in the propagation and preser- the species.*

case of man it appears that no perfectly clear on can be made between his impulses and his . The relation of the individual to the species however, that human instincts are relatively few, an impulses relatively many, when man is com- th the lower animals. Yet the meaning of the tinct can be enlarged so as to include those more that craving in which the ensuing series of complicated movements takes its rise. If the word "instinct" is used, attention is directed to the ideal end of the movements; and more emphasis is laid on the at least obscure mental representation of this end. But this end has no meaning *for us*, however the case may be in the consciousness of bird or of child, without taking the welfare of the species into the account.

Significance of the Instincts. — However the instincts of man are explained and interpreted, there can be no doubt that their most obvious meaning is, as has been said, connected with the propagation and preservation of the species. Further than this we find a considerable variation of opinion not only possible, but even encouraged by different aspects of such complex phenomena. Some writers over-emphasize their physiological explanation and their merely biological significance. This emphasis may even go so far as to reduce the young human animal to a complex sensory-motor mechanism. But from this point of view we must remind ourselves that the proper sensory-motor and ideo-motor mental activities seem inseparably linked in with the possession and use of an appropriate mechanism. A writer on instinct has put the case in this way: "Has the bird a gland for the secretion of oil? She knows instinctively how to press the oil from the gland and apply it to the feather, etc." To speak of "instinctive knowledge" is, indeed, a misuse of terms. But that psychical function and organic development are correlated, there is little or no doubt.

The metaphysical explanation of instinct is suggested to psychology by such observations as those made by Goethe. "There is in the curious and kindly operation of instincts something which, whoever studies and does not believe in God, will not be aided by Moses and the Prophets. In these instincts I perceive what I call the omnipresence of the Deity, who has everywhere spread and implanted a portion of his endless love, and has intimated, even in the brute, as a germ, those qualities which blossom to perfection in the noblest forms of men."

The psychological explanation of human instincts is the only one to which it becomes us to refer in the present connection. This explanation (?) barely describes the probable complexion of a particular class of intricate but confused psychoses, and points out the relations sustained to the existence and well-being of the species by the movements to which the psychoses give rise. It involves the physiological view; it suggests for further reflection the metaphysical.

Kinds of Impulses and Instincts. — The exact classification of the elementary forms of appetitive consciousness is not a matter of great importance to the more general science of psychology. Minute study of specific impulses and instincts is, on the contrary, of great importance to the student of comparative psychology. It accords with our views of the nature of the latter, that, in all the higher mammals, impulsive and instinctive performances are not absolutely uniform and infallible, but are modifiable by experience. Recent investigations in biology seem to have shown that even the most primary of them generally, if not uniformly, require at least some individual example for imitation, or some specific form of stimulation, to render them operative. The duckling that sees the mother duck swimming, and the infant that feels the pressure of the floor underneath its body and, simultaneously, the impulse of some distant object which it desires to reach, begin to swim and to creep — "*instinctively*." But the one is "originally endowed" with a complex swimming, and the other with a complex creeping, mechanism.

It follows that the gap between blindly reflex or automatic mechanism and the most intelligent acquired aptitudes may be filled up with an indefinite number of kinds of impulses and instincts. Thus we hear of such instincts in infants as the instinct to suck, to bite, to clasp, to put into its mouth, to cry, smile, creep, walk, imitate, emulate, fight, etc. We hear also of instincts of play, of shyness, sociability, secretiveness, modesty, etc. Why not say, in a word, that the human animal "has an instinct" to do everything that it can do; and that it does instinctively everything it actually does in the manifold use of its various powers?

In studying the development of mental life, it is, therefore, important to bear in mind how these impulsive and instinctive conscious states are the starters of the whole process of development. All growth of faculty, all beginning of psychical organization, comes in this way. Just as there are as many kinds of instincts and impulses for squirrels as there are things which young squirrels can do,—and among them collecting and storing nuts is, perhaps, most specific and noteworthy,—so the human being has all the increased number and superior kinds of impulses and instincts which belong to him as human.

Nature of Desire. — *By desire we understand that blended feeling and conation which is directed toward some object mentally presented or represented, and of whose pleasure-pain characteristics we have had previous experience.* Thus although all desires are forms of craving and of initial conation, they involve a more intelligent and contemplative attitude toward some particular object than do the impulses or instincts. Desires may, indeed, follow their objects as blindly as impulses or instincts do; but desires are less blind toward their objects. One knows what one desires; but the outreaching of impulsive or instinctive feeling is often enough toward—one knows not what.

The psychology of the desires requires that they should be considered in relation to each of the three forms of the functioning of mind which they involve: (1) Intellect and imagination take a relatively large part in those appetitive conscious states to which the name "desire" is properly given. Such states cannot arise until some presentative and representative knowledge of objects has become possible. Definite, strong, and persistent desires require that their object should be held before the mind as a possible object of attainment. Infants may desire the moon; but the further work of intellect in constructing the moon as such an unattainable and undesirable object as it actually is, destroys it as an object of desire for the adult mind. (2) Without excitement of feeling no desire is possible. But, in general, the massive, low-toned pleasurable feelings are freest from admixture of desire. The rule is that desire characterizes our conscious attitude toward those experiences with which remembered or anticipated pleasure has become connected. Though, as Dr. Ward has said, "instances are by no means wanting of very imperious desires accompanied by a clear knowledge that their gratification will be positively distasteful." But (3) desire is, of all conditions of consciousness, most nearly continuous with what we call "willing." What we strongly desire that we *will*, unless some inhibitory influence checks the transition from the one conscious state to the other. "I will have" follows naturally upon "I badly want." For there is a *dynamic* element in desire which partakes more of the nature of conation than of feeling, as such. Desire is not, however, identical with choice or decision, or accomplished will. How desire differs from the completed "deed of will" will appear later.

Doubtless the complexity of those different forms of appetitive consciousness, to which the name "Desire" is given, accounts for the confused views of psychology on the subject. Thus Rabier, after analyzing correctly every desire into three elements — a sensational (or affective), a representative, and a dynamic — makes the rather sentimental attempt to reduce them all to love, with its aspiration to possess its object. Other writers would reduce all desires to forms of the Ego's effort.

It may be argued against the dependence of desires upon definite mental representation of an object, that children show signs at an early age of a variety of desires, and that many adults, particularly of a certain temperament, are habitually under the influence of vague and undefined desires. But such conscious states should rather be spoken of as impulsive than as kinds of desire. There is, indeed, a condition of restlessness and feeling of the oppression of *ennui*, which is the fault, the charm, the danger, and the secret, of the most brilliant minds. The entertainment of a varying show of ideals operates to produce fleeting and shifting forms of appetitive consciousness, which have certain characteristics of desire. But whether it be Madame de Staël or the average American girl of fourteen, such experiences belong to the vague cravings and impulsive wilfulness of unorganized mental life. *Desires* mean some definite business on hand in the way of attaining an object. *Strength* of desires belongs rather to the masculine and adult mind.

Conflict of Desires. — The very nature of our experience of the effect of willing upon the gratification of desires is such as to bring about a conflict between them. Indeed, inhibition of desire is customarily the solution of a case of conflict. In the complicated conditions of human living, all our desires tend to become conditional; we desire "*if*," or we desire "*although*" and "*in spite of*," or "*because*." The lazy schoolboy hates his lessons; he desires not their mastery. But, again, he desires to get his lesson, because he desires the promised half-holiday or desires to escape punishment. All this is indirect proof that, while impulse is blind, and instinct only *appears* to, but actually does not, regard intelligently the end, desire is more significant of the development of imagination and thought.

The inevitable conflict of desires would seem to give over the field of consciousness to the possession of the stronger desires. And, indeed, this would be true if the subject of the conscious states were a being of desires merely. What actually takes place in all "pure" conflicts of desire is, either (1) the desire **A** overcomes the desire **B** and leads on to its own appropriate deed of will; or else (2) **A** and **B** hold each other in check and prevent the satisfaction of either, while dividing the appetitive ween themselves, as it were. It is thus that y triumphant desires become absorbing passions rb the entire mental development, no matter how y "noble" such desires were. We read, for ex- one Montelli, whose desire for the acquisition edge had made him a sordid intellectual miser, usly learned and yet useless wretch. But the ent of intellect and imagination under the influ- esthetical, ethical, and other practical considera- npers the results of the conflict of desires.

tion of Desire. — The attainment of the object of followed by a unique feeling of "easement" — urable state of satisfaction. There is always a mount of painful tension connected with the con- of strong desire. This painful tension is often reased by the swaying of the stream of conscious- side to side between conflicting desires. In not es the bare relief from this condition of painful or those which arise out of bodily cravings and find their satisfaction in some physical object; (2) Intellectual desires, or those cravings which arise from the constitution of the mind as intellect, and have their satisfaction in certain intellectual activities, or states; (3) Sentimental desires, or those which arise in the contemplation of ideals of beauty or of moral goodness; and (4) a class which may be called pathological, and which comprises all the overgrowths, or monstrous growths, from other forms of desires.

Finally, we are reminded that the character of the mind's desires cannot be understood as separated from its entire development. My desires cannot be weighed and estimated as something apart from me. They do, indeed, often seem to take the position of impulses received like impacts from without — felt *by* the mind, but not *of* the mind. Yet, again, it is even more true that, as a man's dominant desires are, so is he.

[On Impulse and Instinct, comp. James: The Principles of Psychology, I, xxiv; Romanes: Mental Evolution in Man; and Lloyd Morgan: Animal Life and Intelligence. Valuable observations are to be found in Preyer: Mind of the Child, I, xi; Perez: L'Éducation dès le Berceau. Among German monographs are Schneider: Der Thierische Wille; and Santlus: Zur Psychologie d. menschlichen Triebe. The fuller treatment of Desire is to be found in works on Ethics: see especially Sidgwick: The Methods of Ethics, iv; and Leslie Stephen: Science of Ethics, ii.]

CHAPTER IX

PERCEPTION BY THE SENSES

wledge of things, and all the general principles
chological science can establish as to the condi-
laws of such knowledge, must take their start

t of Perception by the Senses. — It is matter of
experience that the adult man learns much about
ies and behavior of things by coming into what
a "face-to-face" relation with them through
. Let one open one's eyes upon a landscape or
object in a landscape. At once, as it seems, a
onsciousness" arises which consists of a number

example, I am directed more safely along the path where my daily interests take me by this series of perceptions, because they are too familiar to attract, or to need, much attention for themselves. Again, in reading, it is the flow of ideas to which my mind is chiefly attentive; but if I do not mind the series of printed symbols, to some extent at least, I cannot apprehend the author's ideas.

Definition of Perception by the Senses. — In a preliminary way such experiences as have just been described may be defined as constituting perception; and, therefore, *Perception is the consciousness, or immediate "awareness," of external objects by the senses.* Some such descriptive sentence as this would probably be satisfactory to almost all adult minds. For the undoubted fact of experience seems to be that (1) *at once* and without any intervention of mental processes occupying time, we become aware of (2) an *external* object — a thing "set out" of us and "spread out" in space; and this (3) by the *senses, without assistance* from memory, imagination, or reasoning. Not one of these three assumptions, however, accords strictly with the conclusions of a scientific psychology.

Such an analysis as any plain man may make reveals abundant reasons for modifying this definition of sense-perception. For (1) any one may readily establish the fact that, after all, it does take time to perceive some things at least, and that, in the case of unfamiliar and complicated objects, we are often in doubt as to what we have *perceived*, even after considerable time. That all perceptions require time is readily proved by laboratory experiments. (2) Moreover, from the psychological point of view, every one's perception is, of course, his own mental affair; the object *is that of which* he is conscious, a "field" of his consciousness — to use the phrase already explained (p. 24 f.). But the same object is in this case "external," a real thing "set outside" and "spread outside" of him. How can this be? Whence comes this *externality* in which the object is said to be perceived? (3) Once more, it is not difficult to discover the fiction in the phrases, "unaided senses," or "mere sense." For if the case is one of any complication or difficulty, the perceiver himself knows that he is trying "to make up his mind" as to what the object really is. He looks, instead of merely seeing; or listens, instead of merely hearing; or feels with active hand, or other movable organ of the body, instead of merely letting the object come into passive relations with his skin. But looking, listening, feeling, are activities involving conation, ideation, discriminating and discerning consciousness. They issue in a judgment pronounced: "It *is* this [or that] particular object."

The bearing of this plain man's analysis, and of the much more complete analysis of psychological science, upon our views as to the nature and development of sense-perception will appear later on.

Problem of Perception. — To the unreflecting mind there appears to be no mystery about our daily use of the senses. To such a mind there is no *problem* of perception. Illusions and hallucinations seem indeed interesting. The phenomena of hypnotism, telepathy, and so-called spiritualism, appear profoundly mysterious. But just ordinary, every-day seeing, hearing, tasting, smelling, and feeling of things — what that is problematical or scientifically interesting can there be in these common-place conscious states? For the genuine scientific man and the devoted student of science, however, the case is precisely reversed. Ordinary perceptions are most interesting, most profoundly mysterious. And there is very little doubt that the scientific mastery of these will one day give us the key to all the wonders in which the lovers of the marvellous find their chief delight.

Perception by the senses is, then, a profound and difficult problem. It is rather a long series, or a confusing tangle, of problems. They may all, however, be stated conveniently in some such way as the following: *How, by combination and development of the elementary processes already described, does the seeming "immediate awareness" of the objects of sense, as external and extended, come about?*

Physiological Conditions of Perception. — The *coördinated functioning* of all the parts of the body concerned in the act of perception — no less than this — constitutes the physiological conditions of perception. Two sets of factors, however, are especially important. These are (1) the combined and purposeful movement of the external organs; and (2) the formation and use, in combination, of "association-tracts" — particularly between the lower and the upper parts (the hemispheres) of the brain, and between the different centres of the upper parts of the brain. The first set of factors is made necessary because, as will appear later, it is only by active use of movable external organs that actual "perception," as distinguished from the merely theoretical having of sensations, can take place at all. The second set of factors is made necessary, because all the elementary mental processes, and all the nervous centres of the brain whose functions form the physical basis of these processes, are correlated and combined in the complex activity of perception. Two principles more important to understand than these cannot be conceived of in connection with this subject.

Perception as involving Many Processes. — The problem of perception as just stated has been made to include one important truth in its own answer. This is the truth that perception, as an adult experience, *does* come about by combination and development of more elementary processes. Let us now expand this statement into the following five particulars: (1) Complex forms of sensation, due to different admixtures of qualitatively and quantitatively like or to that interpretation which the externality sion of things require.

ns of Motion. — A characteristic modification of nsciousness is occasioned by stimulating closely s areas of the retina, especially when the eye is itted to move. The same thing is true of the its accompaniment of muscular and joint sen- Such modifications may be called "sensation- of motion." The sensation-complexes of taste, l hearing, *of themselves considered*, do not admit modification. In saying even this, however, allow for a certain amount of "interpretation" notor changes as a necessary condition of their verted into sensations of motion. The truth of t *certain sensation-complexes of the eye, and of the le- and joint-action included*), *experienced as com- nges of quality, are immediately and instinctively l as "sensations of motion."* We may differ as consciousness of the significance of the experience — marks the earliest unfolding of man's mental life.

The motor sensitiveness of the different areas of the skin can be experimentally tested. Two observers, for example, found that the motion of a metallic point, moving at the rate of 2 mm. per second, could be discriminated when it had amounted to 0.20 mm. on the forehead, to 0.40 mm. on the upper arm, and to 0.85 mm. on the back. But the same point could be moved so slowly as to travel a distance of 6–12 cm., and not be *sensed* as moving at all. From similar experiments two facts become established: (1) Sensation-complexes must change their compound quality discernibly in order to be interpreted as sensations of motion; and (2) the compound quality of these sensations does change discernibly, but with differing degrees of rapidity, for different areas of the nervous mechanism. Even passive bending of the finger was found by Goldscheider to occasion sensations of motion when the arc of its bending was not more than 0.60° to 1.74°.

Visual sensations of motion, with a motionless eye-ball, may be produced in either of two ways: by stimulating contiguous elements of the retina in close succession of time, or by stimulating the same groups of elements with closely successive color-tones. Holmgren showed that when we look at very faint and fine points of light with the eyes elevated, the images seem to move upward in the direction of muscular exertion. Thus sensations of muscular tension may express themselves as sensations of visual motion. The sleeping cat, in the picture on the card, opens its eyes when we change, with the right speed, the object as it appears in reflected light (since the colors on the front of the paper correspond to eyes "shut") to the object as it appears in transmitted light (since the colors on the back, which now shine through, correspond to eyes "open"). Just now the country is full of shows which have their success in substituting a changing series of different images ("kinetoscopic pictures") for a series of actual movements of objects in space.

Sensations of Position.—Here the fact is that *the compound quality of certain sensation-complexes of eye and skin (including the muscles and joints), with the feeling of the accompanying tendencies to motor activities, is interpreted as "sensations of position."* To speak popularly, the skin "feels" differently as its different areas are pressed upon by the same objects; the eye "feels" differently at the different angles of its possible positions,— to the right, left, up, or down; the limbs "feel" differently according to the different positions reached by them, whether passively or actively. Two principles with regard to the origin and development of sensation-complexes of position seem to be capable of defence: (1) Sensations of position are dependent upon previous sensations of motion, and upon the recall of the images of these sensations. (2) Sensations of position involve at least that low degree of discriminating consciousness which enters into every kind of "tact." These sensation-complexes, on account of differences in their compound quality, admit of interpretation which signifies differences that lie beyond themselves. But if there had been no previous experience with the organs in action — no net-work of sensations and series of sensations of motion,—such interpretation would be quite impossible. *The significance which sensation-complexes of position attain in the way of defining the spatial qualities and spatial relations of external objects is dependent upon a previous experience of sensation-complexes of motion.*

Experiments to determine the "sense of locality" belonging to different areas of the skin began with E. H. Weber's classical discovery. By using the two points of a pair of compasses, so covered as to avoid the sensation of being pricked, he found that when these points were separated 1 mm. on the tip of the tongue, and 2 mm. on the volar side of the last phalanx of the finger, they could be discriminated as two: a separation of 68 mm. was, however, necessary for the same act of discrimination on the middle of the back. This variation cannot be due to fixed degrees of original sensitiveness to stimuli in the physical organ. For it may be reduced by practice; and practice on one side of the body increases the power of discrimination for the corresponding parts of the other side. Speaking figuratively, the "sensation-circles" of the different areas of the skin vary greatly; and the discriminating sensibility of this organ is in the inverse ratio of the size of these circles for its different areas.

The nature of the sensations of position which develop in the use of the eye is much more obscure. It has been long known that stars not more than 70″–30″ apart can be discerned as separate by the best observers; but for other observers the *minimum visibile* is much larger. Now since this distance corresponds pretty well with the calculated breadth of the cones in the "yellow-spot" of the retina, it has been assumed that visual sensations of position are independent of the motion of the eye. Here, however, the psychologist cannot neglect the significance of the fact that visual experience is never, from the earliest dawn of consciousness, with a motionless and passive retina. From the first, the eye is in ceaseless action. And experiment seems to show that movements of the muscles, even so exceedingly minute as to correspond with the *minimum visibile*, have a modifying effect upon visual sense-consciousness.

We conclude then, that apparently, *our light- and color-sensations are localized by means of varying mixtures of sensuous elements derived from stimulation of different areas of the retina and accompanying muscular and tactual sensations of the moving eye-ball.*

Influence of Attention. — It is most important to notice that our sensation-complexes, both of motion and of position, are brought into clear consciousness only by an act of attention. Suppose we ask ourselves for a definite answer to the question: Whereabouts on the field of my eye or skin is the stimulus applied; or in just what position has the organ been passively placed? Such a question is itself a proposal to examine and see. The very proposal to direct attention produces important changes in the sensory condition of the organ. It alters the capillary circulation and throws the muscles into a condition of tension. Hence it comes about that *no peripheral area can be stimulated without the resulting sensation-complex absorbing into itself the result of the motor changes or tendencies to change brought about by the attention directed to this same sensation-complex.* This principle of the absorption of the products of attention into the sensation-complex must never be neglected.

Sensation-Complexes as "Local Signs." — We are now ready to see the bearing of this enormous variety of nicely graded mixtures of sensation upon our scientific study of perception by the senses. It is not fair, of course, secretly to convert these mixtures of *our* sensations into qualities and relations of *external* objects. The development of intellect, according to its own laws, will have to give us the fuller account of this process of "converting" — if we may use, for the moment, so ambiguous a term. We may see, however, what a system of sense-experiences is provided, and how it is fitted to lend itself to the mind's discriminating and interpretative activity. Or, rather, we may see what a vast differentiation of our sense-experience may be systematized by the interpreting work of discriminating consciousness.

The theory of "local signs" depends upon the following apparently well-established fact: *The total compound characteristic of every distinguishable mixture of sensations changes with the locality of the organ where the excitement occasioning that particular mixture originates.* Thus these mixtures are able to "signify" the different positions and motions which our bodies and external objects may assume or undergo. The limit of the differentiation of these mixtures is the limit of our ability to discriminate differences of locality, and so differences in the size, shape, and space-relations of things.

Even an unskilled analysis illustrates and enforces the existence and usefulness of so-called "local signs." Let any one rub gently together the tips of the two corresponding fingers, and attend strictly to the series of sensation-complexes thus produced. If the finger ($\mathbf{F}^r$) of the right hand differs greatly in the texture of its tip from the corresponding finger on the left hand ($\mathbf{F}^l$), — if, for example, $\mathbf{F}^r$ has not, and $\mathbf{F}^l$ has, a callous spot — then the sensation-complexes of the two fingers will be easily distinguishable, as such. But if the two fingers are alike in texture, the sensation-complexes corresponding to the two may be indistinguishable in respect of their compound quality. The results in perception will be as follows: $\mathbf{F}^l$, having the callous spot, on being lightly pressed against $\mathbf{F}^r$, will appear as a foreign body being touched. But if sensation-complexes $\mathbf{F}^l = \mathbf{F}^r$, then either finger may be regarded as touching the other, or as being touched. Yet, again in this case, by moving either finger we can easily compel ourselves to regard F^l as touching F^r, or F^r as touching F^l. The moving finger is touching; the finger held still is being touched.

It accords, too, with the theory of local signs that Binet, following Weber's experiments, though with important modifications, comes to these conclusions: (1) "The sensations provoked by the two points of the compasses are of different quality when the subject perceives the two points; (2) the sensations provoked by the two points of the compasses are of the same quality when the subject perceives a single point."

General View of Perception by the Senses

Principles of all Development of Sense-Perception. — It follows from our entire study of the facts that the knowledge of extended and external objects is a development. This is as true of that kind of knowledge which is called *perception*, and which appears to be immediate and "face-to-face," as it is of our knowledge *about* things, or our scientific knowledge. But the conditions and laws of the two kinds of knowledge are not the same. For example, the knowledge that the water in this tumbler is, chemically considered, H_2O, or that it has such a standard specific gravity, differs greatly, in its character and grounds, from the knowledge gained by looking at and lifting this particular tumbler of water. Just now, however, it is of this perceptive knowledge that we wish to maintain: It, too, is the result of a development. The theory of sense-perception is scarcely more than a history of the development of sense-perception. Proof and illustration will, then, occupy us through the remainder of the chapter. But it is well to precede this more detailed examination by clearer recognition of three important points.

(1) There is no complete break anywhere in the development of sense-perception. The principle of continuity applies here. Yet important stages may, for theoretical

, be recognized. In the evolution of the chick,
nuity of process is to be emphasized; but hatch-
important event for the growing bird. So there
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al of a clear consciousness of the extension and
ity of things. The same powers of an attentive
riminating consciousness are immanent in the
perience from the first. The "fusion" and "com-
of those theoretical factors, which the psycholo-
mes, — namely, the simple, unlocalized sensa-
is an accomplished fact from the beginning.

wo principal stages in the construction of presen-
f sense may, roughly speaking, be recognized.
re sometimes called "localization" and "projec-
or "eccentric projection," although there are

form the conception of an inner circle of self-hood, as it were, to which I regard the different parts of my own body as external, and in relation to which, as a centre of perceiving activity, I perceive both things and bodily members in a system of localized objects.

(3) In the complicated history of the development of sense-perception, certain senses have a part far more prominent than that which can be assigned to the others. It is our sense-experience gained through the eyes, and through the skin, muscles, and joints, which gives the "face-to-face" knowledge of things as "out" and "spread out" of ourselves. Perception, as "the immediate awareness" of external and extended objects, comes primarily by Sight and Touch alone. The other senses give secondary and more inferential knowledge of the qualities of objects, as those objects have already been perceived by sight and touch. The red-colored extensions, with their velvety "feel," which I hold in my hand, *are* the rose; the smell which I localize, as also "felt" in the areas of my nostrils, is the smell *of* the rose.

The so-called "Spatial Senses." — The truth just stated is so necessary for understanding the development of perception by the senses as to need further consideration. All detailed study of the perceptions of the different senses will illustrate it. The spatial qualities and spatial relations of things *are* made known to us by sight and touch — using this latter word to include sensations of the muscles and joints, as well as of the skin. Such qualities and relations *are not* made known to us by smell and taste, exclusive of touch. The negative statement applies less obviously to hearing; still, it does apply to hearing also.

If inquiry be made into this preëminence of these two kinds of our sense-experience over the other kinds, the three following reasons may be given for it. These reasons have chiefly to do with *the character of the sensation-*

s excited successively by the stimulation of the
; localities of the organs of sense. Only the eye
skin (including muscles and joints) are capable of
ise to "spatial series "of sensation-complexes.
especially, (1) *Spatial series* of sensations pos-
ystem of local signs, as non-spatial series do not.
tastes, and tones, as such, are not variable in
nanner as definitely to "signify" the locality of
ıns in the excitement of which they originate.
ial series admit of easy, frequent, and rapid repe-
n varying order of arrangement, as non-spatial
ɔ not. Thus, we shall see that sensations of the
l of the skin, muscles, and joints, run through
eries that may be repeated in a variety of direc-
vhile those of the organs of taste and smell do
3) Two spatial series of sensation-complexes,
xperienced simultaneously, or in close succes-

important inquiries. (1) Do sensation-complexes which include no motor elements ever possess *primarily* — that is, without fusion or association with sensations of motion or of position due to previous experience of motion — the attribute of extensity? To this question we have already given in part our reasons for a negative answer. (2) Have the most primitive sensations of light and color — the shades which might be produced by moving the object over the field of a perfectly motionless eye — the attribute of extensity? Here, again, though not so positively, we are inclined to a negative answer. Discriminating consciousness, as practised with a moving eye, is necessary to the vaguest perception of "bigness" as belonging to visual sensation-complexes. But then we have this practice with a moving eye from the very dawn of consciousness, in the case of all normal infants. (3) Is the perception of the size and contour of motionless objects, when in contact with the skin, dependent upon the images of past sensations of muscular and tactual sort, acquired with motion of the organs? This question, too, should be answered in accordance with the same view of the functions of the sensory-motor mechanism: It is thus dependent.

All perception of extended and external objects is, then, acquired as a matter of growing experience. Thus far our conclusion agrees with the empiricist. *But no perception of external and extended objects is the mere result of the fusion and association of sensations.* From the start, the psychologist is obliged to recognize the activity of discriminating consciousness, at work according to laws of mental life. In other words, the "native" character of mind shows itself in constituting its own sense-experience as a system of interrelated objects, external and extended in space. This conclusion accords with the nativistic position.

By a "nativist" is ordinarily understood one who assumes the cognition of the spatial qualities and relations of objects as due to a *native* power of the mind; he, therefore, denies that any analysis of experience can account for that which, as he holds, the mind does not acquire by experience. By an "empiricist," on the other hand, is generally understood one who holds that the perception of space-qualities and space-relations is acquired; he denies that we have any right to speak of a native "intuition" of space. As extreme, old-fashioned nativists may be instanced the Scottish School; they, on the basis of the testimony of crude, unanalyzed, adult consciousness, taught that all kinds of sensations are from the first intuitively known as external and extended objects. A modified, scientific nativism, of a carefully limited character and based upon a searching analysis of sense-consciousness, has been held by writers like Stumpf in Germany, Ward in England, and James in this country. These writers attribute "extensity," or primordial "bigness," to all sensations as such. Professor James also holds that movement is not necessary to space-consciousness, but only renders it more definite.

Our position differs from both classes of writers just referred to, but agrees in the main with a considerable number of the best authorities. With Professor Sully we hold that, "whatever the precise nature of this primitive 'massiveness,' it seems reasonable to conclude that it requires the incorporation of motor ideas before it becomes *spatial*, as we understand the term." More decidedly: *We hold unequivocally that perception without motor consciousness is impossible.* Finally, we hold that to speak of the "extensity," as distinguished from the intensity of smells, tastes, sounds, as such, is absurd. On the other hand, we admit that no theory of perception is adequate which recognizes *merely* the fusion and association of sensation-complexes under the principles of habit, of contiguity, and of similarity or contrast. *A constructive intellectual activity must also be recognized.* And the constitutional forms of this activity, which the most searching and thorough analysis is compelled to admit, may fitly be spoken of as "*native*" to the Mind.

We may, therefore, now declare, what will be at once proved and illustrated in detail by a consideration of the perceptions gained by the different senses, namely: —

A Summary of the General Conditions of Sense-Perception. — *Two or more series of sensation-complexes, having the characteristics of "spatial series," and belonging to the* *same or to different organs of sense, occur simultaneously or in immediate succession; they are frequently repeated in this close conjunction in consciousness, and become associated with conative impulses that result in movements of accommodation; representative images and traces of conative impulse due to this frequent repetition, are combined with, and habitually suggested by, similar sensation-complexes in every new experience; feelings of interest, expectation, etc., become the habitual affective accompaniments of this complicated "mass" of sensation- and ideation-elements; and discriminating and relating consciousness is ever active (comparing, assimilating, differentiating) to accomplish the higher unifying processes which are necessary to the cognition of all objects of sense.*

But — it may be inquired with astonishment — does the infant begin to accomplish all this complicated product of a psychical mechanism? And is the plain man's consciousness to be accused of such intricate performances in the way of practical mastery of things by use of the senses in his daily life? To such questions the scientific student of mental development is obliged to answer, "*Yes*"; — and with emphasis. For all that his science can disentangle from the web of conditions which surrounds the perfected sense-perceptions of the average mind is but a broken and imperfect picture of the actual achievement. In this respect, his problems and his success in solving them, resemble the experience of his colleague, the biologist, who is studying the process of building the organism correlated with this psychical development.

It should also be noted that, in the development of perception by the senses, any original resemblance to a passive copying process becomes constantly more remote. For, first, the relative amount of sensation-complexes that have a genuine peripheral origin becomes smaller; the relative amount of the complex processes due to revived l to rapid judgments habitually performed, be-eater. Physiologically expressed: perception re *brainy*. Psychologically expressed: percep-mes more a matter of *ideation* and of "*impul-rence* (if we may provisionally be allowed such But, second, the development of practical and l interest in making careful discriminations, ower to make them, results in increasing the n content of the sensation-complexes. Things less "in the lump," as it were.

re, increase in the wealth of sensuous details and a al and intellectual quality, both belong to the more sense-perceptions.

ELOPMENT OF SENSE-PERCEPTION BY THE DIFFERENT SENSES

sider, first, the case of the "non-spatial" senses, against its surfaces, that makes *objective* our various smells and tastes. The smell and the taste of anything are qualities attributed to it by a system of secondary and doubtful inferences, but only in case it has already been constructed as a thing in terms of sight and touch.

Nice perceptive distinctions in the smells and tastes of objects do not tell us anything directly about the spatial qualities or relations of those objects. Hence they are chiefly of biological or æsthetical value. They give information as to the probable salubrious character of objects; they quicken or depress our vital energies; they please or disgust us. But they never directly inform us how large things are, or what shape things have; it is only by their varying intensities and qualities that we are able indirectly to assign them to the things whose smell and taste they are.

It is interesting to observe how the less intellectual men and races are often most discriminating in the use of these senses. Haller narrates that the negroes of the Antilles can distinguish by smell the footsteps of a native from those of a Frenchman. Humboldt affirms that the Peruvian Indians know the smells peculiar to different races of strangers. With this might be compared the claim of the Roman epicures to detect by taste the leg on which the partridge had slept the night before being killed. Hypnotic subjects sometimes develop such an astonishing acuteness of olfactory sense as to distinguish the specific odor of the objects belonging to a number of different persons, and to assign to each one his own. This is more like an animal "cunning" than like the intellectually developed perceptions of the average adult man.

Perceptions of Hearing. — The case of those perceptions of extended and external things which are gained by hearing is not so obvious. No one would think, however, of affirming that auditory sensations make us immediately aware, in any distinct way, of the size and shape of things. If we know certain portions of our own bodies as the more or less extended "seats" of the affection, it is

ecause these portions are *felt* to be set into vibra-
ressed upon, or in a condition of muscular tension.
ther hand, most sounds are, apparently at once,
mewhere outside of our bodies, and are situated
in direction, and at a certain distance, from us.
also perceived as the sounds "of" this or that
object, — of a striking clock, a passing carriage,
voice, etc. The knowledge of the kind of object
ch the sound emanates is indisputably the result
s experience, which has given to our eye or to
that particular sort of an object as responsible,
k, for that particular sort of sound. The inquiry
narrowed to this: How do we come to perceive
external and as having a particular direction
nce?

question just raised, the analytic treatment of
experience and of experimental data gives the
probable answer: (1) It is by means of their

system of space-perceptions, before it hears sounds as external and in this or that direction. But hearing is constantly led by the spatial senses, and is dependent upon them for all its achievements in localization.

As to the distances at which familiar sounds are localized, there is no difficulty in recognizing the simple principle. Their varying intensities as compared with the memory-images of what may be expected at an assumed distance, serve as "local signs." In dreams an insignificant crackling in the ears is heard as a cannonading or as a series of thunderbolts. The chorus at the opera make the impression of retreating to an immense distance by softening their voices; and the oratorio lets us hear the celestial choir by a similar device.

Recent experiments (by Mr. Matsumoto, in the Yale Psychological Laboratory) appear to establish, beyond doubt, the fact that the relative intensity of the sounds in the two ears is a chief means for localizing their direction. For if a person is placed in a chair, blindfold and mid-way between two stationary telephones of similar quality, then the one sound which he hears may be made to pass from side to side, around in front or back of the head, or even through the head, by varying the difference of the intensities of the two components. And the accuracy of localization appears to agree fairly well with the difference in these intensities. Possibly additional evidence comes from a number of cases where those suffering with anæsthesia of the skin of the external meatus and tympanum have been quite unable to tell even on which side of the ear the sound was.

Perceptions of Touch in General. — To avoid useless repetition, we shall now regard the term "perceptions of touch" as including all that seemingly immediate awareness of external and extended objects which comes through the organs of skin, muscles, and joints, whether these organs are in movement or at rest. For purposes of convenience we shall also make a somewhat abrupt separation between perceptions gained in this way, of the bodily organs themselves, and perceptions of things external to the bodily organs. That both these classes of perceptions belong to adult experience admits of no doubt. Grown people know by touch and sight, with more or less teness, the smaller areas and larger masses of their lies. But grown people also know the space s and space relations of things external to the the same organs of sense.

actual development of sense-perception by touch, wledge of one's own body and the knowledge of dies are interdependent. The origin and early of these two classes of touch-perceptions cannot dered apart. But in the later life, the perceptions elative positions and movements of the bodily drop out of consciousness to a large extent. because we forget to notice *how the different parts dy feel*, our practical interests being best served ntrating attention on *how things actually are*, as n space to one another and to our own bodies.

equirement of perceptions of touch relating to our lies will first be briefly traced. It must not be n, however, that this treatment compels the separamoved when it is awake, without producing series of changes in the sensation-complexes of its skin, muscles, and joints. On repetition of the movement through the same arc, the revived mental images of its earlier sense-experience fuse with the freshly awaked series of sensation-complexes. Such a "sensation-mass," fused with these ideation-products, and accompanied by affective and conative elements, *is the moving arm of the infant so far as it is perceived in terms of touch.*

Let **A** be the limb in movement from **X** to **Z**, and s, m, and j (skin, muscles, joints) the three kinds of sensations evoked. Then by repetition a fusion takes place between the series (s, s_1, s_2, s_3, *etc.*), (m, m_1, m_2, m_3, *etc.*) and (j, j_1, j_2, j_3, *etc.*). Thus by the principle of condensation of series (see p. 142 f.), and in accordance with the laws which govern the particular associations (see p. 144 f.), one position (**Y**) of **A** will be characterized by ($s_2 + m_2 + j_2$), fused with primary images of (s_1 and $s + m_1$ and $m + j_1$ and j), just fading out of consciousness, and reviving images, with a stirring feeling of expectation, corresponding to ($s_3 + m_3 + j_3$, *etc.*). What is true of this one position (**Y**) will be true of every other, such as **L**, **M**, **N**, etc.

Touch-Perceptions of the Positions of Parts of the Body. — It has already been shown that sensations of position are secondary and are dependent upon previous experience with sensations of motion. The same thing is true of the relation between perceptions of positions and perceptions of movement. Two important differences characterize these two kinds of touch-perceptions: (1) Since any part of the body, when at rest, must either be *held* in position by its own muscles, or *supported* in position by some external thing or other bodily member, the passive sensations of pressure are more prominent in our perceptions of position. In the special case, however, where one part of the body supports another part, there are two "sensation-masses" which invite discriminating attention. These correspond, respectively, to the perceptions of "supporting" and "being supported," or "resting upon." But

(2) in the perception of the position at rest of the movable members of the body, we are much more dependent upon the accuracy of our memory-images. Experiment shows that localization is more inaccurate under these conditions. And the experience through which one goes in being the subject of experiment reveals the effort to imagine how the limb *would feel*, if only we could move it, or could define its position by moving some other part of the body over it.

We now see how the sensation-elements for the perception of position are marked off from those for the perception of movement. *The immediate awareness of the position of the movable members of the body is largely a system of associated ideas due to previous movements.*

Vagueness of First Bodily Perceptions by Touch. — The earliest perception of our own bodies by touch consists of a vague discrimination of those members which move most frequently, and whose movements have a strong emotional tone. As rivals in this form of early sense-consciousness may be mentioned such bodily parts as are more frequently pressed upon or stroked, and which also thereupon feel most of pleasure or pain. To the first class belong the active arms and legs; to the second class, the more passive but sensitive abdomen, back, and face. Confused and crude sensation-masses corresponding to these bodily members probably constitute the total touch- and muscle-percept of its body for the very young child. The adult may produce the nearest representation of these early touch-perceptions by directing attention solely to the localized sensation-masses, which afford all the "immediate awareness" he has of his own bodily members as *felt* existences for himself. In conducting such an experiment, nothing is more suggestive of true theory than the "life-likeness" which is put into each particular perception when the bodily member is moved, and attention is clearly directed to the resulting modification of sense-consciousness.

Division of the Bodily Perception-"Mass." — Finer discriminations of locality upon the surfaces of the skin are the later achievements of attentive consciousness. The data for such discriminations are the sensation-complexes interpreted as local signs, in a manner already described (p. 179 f.). Prompt and accurate localization of a "where-one-is-hit," does not come by any means at first. The crying infant, even if it could speak, could not tell the place of the pin sticking into its flesh. Even adult discriminations of this sort are rather inexact for most persons, and are capable of large improvement under practice for all. But the adult has a relatively detailed and precise *visual* picture of most of the bodily surfaces, into which he can set, at nearly the correct place, his sensations of touch. The infant, on the contrary, has no picture — either tactual or visual — into which it can set its pain.

Two principles chiefly govern the breaking-up of this "gross mass" of sensation-complexes of touch. (1) *Intellectual development is concerned in, and is gained by, all active analysis.* The infant cannot map out its tactile and muscular body without attaining a considerable growth in discriminating consciousness. It grows in power of discrimination by the continuous and successful effort to master the perception of its own body, — by the study of its own body's geography. But (2) sensations of motion precede and lead sensations of position in respect of effectiveness. If, for example, one of the two points of a pair of dividers be prepared so that it can be given a rotary motion, suddenly rotating it will almost always make the points seem two, when just previously they have been perceived as a single impression. In general, *it is the discriminable difference between two most nearly alike sen-*

mplexes, as derived by motion over the skin, which xtreme limit to our tactile perception.

reat value of those means for locating the minuter n-areas of the skin which are derived from their y, when stimulated, to motor reactions, accords same principle. The crawling of an insect makes creep or shudder, and calls out a tendency in the reach and examine the offended spot. These d feelings and conative impulses become impors in the refinement and increased accuracy and ess of this form of localization.

ing of the Body in Space. — The perception of the relations of the different principal masses of the d of the entire body to surrounding objects in a much more complex affair. It is not ordinarily solely, or even chiefly, of the skin, muscles, and The feelings of pressure of one part of the body have already given the partial account of our touch-perception of other bodies. For whenever these members are presented to us by touch, our perception of them implies discrimination between two "sensation-masses," or series of sensation-complexes. These two correspond to (**a**) some member of the body touching, and (**b**) some other member of the body being touched. What is still necessary is some means for a discrimination which shall correspond to (**a**′) some member of the body touching a thing and (**b**′) some body of a thing, that is not my body, being touched.

This further work of discrimination prepares the way for that achievement of a "diremptive" character which sets the Self over against a world of external and extended Things. It is made possible by two classes of data: (1) Certain spatial series combine, with a marked accompaniment of feeling vividly colored by pleasure-pains; but other series are relatively toneless in respect of pleasure-pains. (2) Certain spatial series are connected with our conation and conscious self-activity in a markedly different way from other spatial series. In general, *the discrimination of our own body from other things is mainly dependent upon relations to our feeling and will.*

First Vague Perception of Other Bodies by Touch. — Undoubtedly the infant first perceives external objects in the same vague way in which it perceives the different parts of its own body. In the perception of things it is sight which is, from the first, most influential. But the process of discriminating its own body, as known to touch, from other things is made possible, and even compelled, by its varied experience with either free and comparatively tone-less movements or resisted and feeling-full movements. Spatial series of sensation-complexes that are habitually accompanied by pleasurable or painful feeling are perceived as parts of its own body; other spatial

t thus accompanied with pleasure-pains, are per-
external objects. The infant feels its own body
erior, and pleasurable or painful way. It feels
ore coolly and objectively. Spatial series of sen-
mplexes that are dependently connected with
are perceived as movable members of the body;
ies not thus dependent are perceived as bodies
from our own and as opposed to the voluntary
ts of our own body and of its members.

mple, let **A** (the arm) on moving from **X** to **Z** develop a
omplex sensations = (s, s_1, s_2, s_3, etc.), (m, m_1, m_2, m_3, etc.),
etc.) (comp. p. 193). Now let this series be interrupted
point ($s_2 + m_2 + j_2$), and another series tinged by intense
effort or pain take its place. The *new* series consists of
ions produced by striking against some thing (s^x), of mus-
t to arrest in a state of tension (m^x), and of joints com-
). Moreover, the young animal, when resisted, impulsively
increased conation. This appearance of an abruptly
sensation-mass" in consciousness ($s^x + m^x + j^x$), with its

ing series of tactual and muscular sensations. One of these series corresponds to the perception of touching and the other to the perception of something touched. If any object is simply pressed against the skin, the perception of its size and shape is relatively inaccurate. Weber, indeed, found that the circular form of a tube $1\frac{1}{2}$ Parisian line in diameter could be distinguished on the tongue, while it required a size of $3\frac{3}{4}$ inches to make the same distinction on the skin of the abdomen. But the tongue, like the tips of the fingers, is not only most sensitive to differentiations in tactual sensations, but is also a ceaselessly movable organ of touch. How badly deceived it may be, however, when unable to call in the aid of sight, its estimate of the cavity left by a newly drawn tooth makes obvious. The blind rarely, or never, attempt to measure surfaces accurately otherwise than by running the finger along the boundary lines. *It is the mobile organ which carefully delimits its object.*

Superficial Qualities of Bodies by Touch. — Bodies are known as "rough" or "smooth" to touch by the character of the sensation-complexes produced when moving some tactile organ (preferably the hand) over them, or when moving them over some organ. "Hardness" and "softness" require that *emphasis* be given to tactual and muscular sensations by the moving member being resisted. Temperature sensations, too, have no small influence on the perceptions called forth by bodies in contact with the surfaces of our body. The weight of the same thing appears to change with its temperature, although the results as bearing on the character of the change are somewhat conflicting. The smoothness of polished marble is partly due to its appearing cold. Both pressure and temperature sensations combine in the perception of "moist" and "dry" surfaces, and in all cases where different degrees of "friction" and "sticktion" are involved.

ion of Solidity by Touch. — There is abundant evi- how that, were it not for resisted movements, no solid and real things could come into existence ind. The perception of the solidity of bodies, e various modifications of this general quality, involves that peculiar emotional and conative f the stream of consciousness which accompanies ctual, muscular, and joint sensations. In a word, *e other bodies as having weight, impenetrability, ., by comparing together spatial series of sensation- that are, chiefly, wide-spreading and strong tactual, and joint sensations, fused with intense feelings of with other emotional modifications, due to superin- ion of the organs involved.* Among these "organs " are the internal organs of circulation and of n,— especially in all cases of great exertion on art.

gain the influence of *motor* sensations and of mind, obeying the same laws, develops both classes of perceptions.

Classes of Sensation-Complexes concerned in Vision. — Nothing can be more erroneous than to suppose that vision is a mysterious "copying-off" process which ready-made things somehow effect upon the brain or the retina of the eye. It is the rather a *mental achievement*, which involves the growth of discriminating intellectual life dealing with a complicated variety of "sensation-data," so to speak. Among such data are the following: (*a*) Sensation-complexes of light and color, of varying qualities and intensities, due to simultaneous excitement of contiguous nervous elements of the retina; (*b*) sensation-complexes of tactual and muscular order, due to movement of the eye-ball; (*c*) other sensation-complexes due to accommodation of the eye for near distances. These combine with (*d*) mental images of past sensations of all three kinds; and with (*e*) faint accompaniments of affective and conative consciousness.

Moreover, the more developed forms of visual perception involve other sensation-complexes that are localizable around the eyes, or in the neck and upper part of the trunk. Nor is the development of this form of perception without assistance from certain obscure sensations due to pressure and movement in the fluids of the semicircular canals and to the other means employed for orienting our bodies in space by touch (see p. 196 f.). For we see things in surrounding space according to our perception of the position of our own bodies, and especially of our own heads, with reference to the earth.

Stages in Visual Perception. — Various stages may be distinguished as marking the increasing complexity of that problem which is before us in the attempt to understand perception by the eye. These stages are not distinctly separable in the actual development of perceptive faculty.

sive and less accurately coördinated movements exist from the first dawn of consciousness; the very structure of the eye is such as to force a constant improvement in the early efforts at coördination.

We conclude, then, that *all visual perception, even the most primitive, requires the fusion of sensation-complexes of light and color, which are discernible as "local signs" of the retina, with other sensations and images of sensations, of a tactual and muscular order, which are due to movement of the eye.*

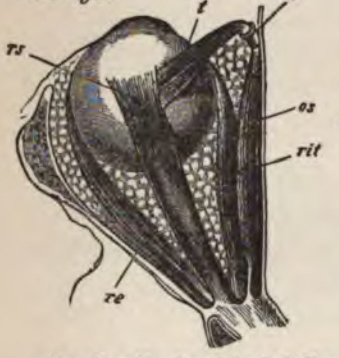


Fig. 13. — Muscles of the Left Human Eye, seen from above: *rs*, rectus superior; *rit*, rectus internus; *os*, superior oblique, with its tendon *t*, running through the pulley *u*.

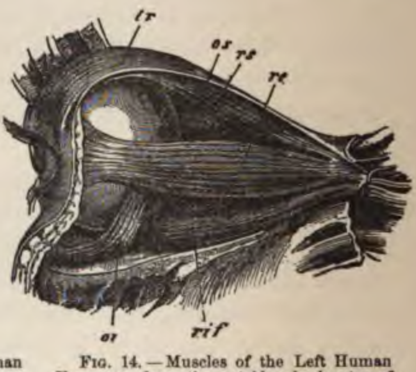


Fig. 14. — Muscles of the Left Human Eye, seen from the outside: *lr*, levator of the upper eyelid, which covers the rectus superior, *rs*; *rif*, rectus inferior; *oc*, inferior oblique; *re* and *os*, as in Fig. 13.

Construction of a Field of Vision. — In the construction of a "field" of visual perception, as in the construction of every "field" (compare p. 22 f.), discriminating consciousness is presupposed. In that experience which every adult has when, on opening his eyes, a number of objects that are external, extended, and related to one another in space, appear before him, thousands of acts of discrimination, through years of mental development, are presupposed. We propose now only to describe the data of sensation with which — to speak in a permissible figure of speech — this discriminating consciousness deals. These and the mental activity involved in vision will be better understood by noting, first of all, the obvious effect of a wandering "point of regard."

The construction of the eye is such that the image of an object is distinct only when this image falls upon a small spot in the physiological centre of the retina (the *fovea centralis*). But we are born with an irresistible tendency to bring the image to fall upon this point and to fixate it there. The infant's first impulsive movements of the eye may be spoken of as experiments in learning how to do this. The point in the object whose image falls upon the physiological centre of the retina is called the "point of regard," or the "fixation-point." Both terms are suggestive of important truth; for it is the object whose image falls just there which we *fixate* with attention, and most discriminatingly *regard.* And in that rapid but real activity of selective attention which is necessary to distinct visual perception, the eye is actually surveying the object with a wandering point of regard. It is the motor-sensations, and the sensations of position gained by its momentary pauses, which are needed in order to construct the visual field. Indeed, this fact of almost ceaseless movement can be made obvious by any mechanism which reveals and magnifies the arc through which the movement takes place.

The following conclusion is, then, reached: *Every field of vision, and every object seen in every field, chiefly depends for its spatial qualities upon changes produced in the muscular and tactual sensation-complexes by a moving "point of regard."*

When, however, the distance of any object is much changed, in order to get a distinct image of it at the point of regard it is necessary that the convexity of the lenses of the eye should be changed. This change is effected, chiefly, by relaxing the tension on the front part of the lens and allowing it to bulge out with its own elasticity. No muscular strain is involved in allowing the lens to be kept flat by the pressure of its capsule; but on approaching the object very near to the eye, the strain and the consequent fatigue required through the effort at accommodation increases. These sensations of accommodation for near distance may be made more prominent in consciousness by directing attention to them; experiment shows that they have a considerable, though somewhat indefinite, value in our perception of the distances (especially the *relative* distances) of visual objects.

The accompanying figure (No. 15) gives a schematic representation of the apparatus of the eye for accommodation. As Professor James has said, "the feeling of accommodation has no very clear and fixed value." Yet Wundt, by looking with one eye at a black thread stretched against a white background, and through an aperture in a shield, claimed to find that relative positions could be distinguished with considerable accuracy; but almost nothing could be told in this way about the absolute distance of the thread. In estimating the size of objects, too, the relaxation or increased tension of the muscle with which we accommodate may have an important bearing. Donders held that this is a chief reason why spectacles of moderate convexity magnify the object. The more recent investigations, however, seem to leave the value of the changes in accommodation still in doubt.

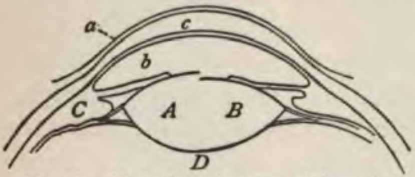


FIG. 15. — Mechanism of accommodation: *A*, the lens during accommodation with its anterior surface advanced; *B*, the lens at rest; *C*, position of the ciliary muscle; *D*, the vitreous humor; *a*, the anterior elastic lamina of cornea; *c*, corneal substance proper; *b*, posterior elastic lamina.

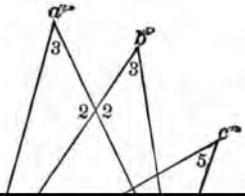
One other important truth is connected with the construction of any field of vision by a single moving eye. All objects which lie so far out of the points of regard as to be seen in "indirect vision" are perceived out of their actual place. For example, the retinal images of things perceived, indirectly, as straight are bent; and in order that things thus situated may be seen as straight, their images must be bent. In general, *it is only by a sort of mental transposition which we have learned to make, and which is based upon our experience with moving eyes as corrected and guided by associated images of past sensations, that the spatial relations of objects seen in indirect vision are perceived at all.*

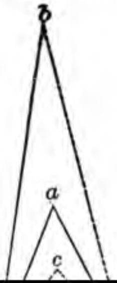
The influence of the images associated with all the different excursions of the eye, with its wandering point of regard, appears more clearly as we consider —

The Conditions influencing Binocular Vision. — In the great majority of cases it is not with a single moving eye, but with a pair of eyes which move synchronously and more or less in correspondence, that we perceive external and extended objects. The two eyes are much more emphatically *one* organ than are the two ears. So true is this that the silly question which used to serve as a stock puzzle for the psychologist — "How can one thing be seen, by means of two images, that differ materially, upon the two eyes?" — is answered by saying: "Perception of one solid thing, under all ordinary circumstances, *is* vision with two eyes."

For the physics and physiology of binocular vision we must refer to books which treat the subject from these points of view. It is enough for our purpose to notice what modifications of sense-consciousness necessarily result from the fact that we perceive visual objects with *two moving eyes.* "Two moving eyes" implies two sets of movements and of resulting sensation-complexes of motion and of position; and two series of retinal sensations capable of apprehension as local signs. For each eye has its own point (and line and plane) of regard, and its own movements of rotation, torsion, and accommodation; each eye is a complete optical instrument. The two eyes are not optical duplicates; yet they constitute one organ of vision.

tudy of the optics and physiology of binocular vision
sizes two sets of considerations valuable for the
logist: (1) When both eyes are motionless, it is
nder very limited conditions that the images formed
two retinas are capable of exact, or of nearly exact,
position; (2) when both eyes are in movement,
es in the relations of their images are constantly
place, and these changes correspond to all the
ons reached along the arc of the motion of the





solidity. If we hold a finger up against the sky and look steadily beyond the finger, it is now perceived as two transparent images of a finger and not as one "real" finger. The effect of moving the eyes, upon the sensation-mass seen with closed eyes, — to make it move up or down, to the right or to the left, or to locate any minute portion of this sensation-mass, — illustrates the same truth.

Psychologically expressed, vision with two moving eyes means that two systems of spatial series of sensations — fusing, uncoupling, and fusing again — are being used by discriminating consciousness to determine the visual object as external and extended. Its size, shape, and distance (including especially its extension in the third dimension), and its spatial relations to other objects in the field of vision, are being perceived upon the basis of this double set of data. But here, as elsewhere, so skilful and rapid has the mind become in its seizure of the important data and in its relatively sure interpretation of them, that the details of the process have dropped out of consciousness. Here also, as everywhere, the extent of our scientific analysis is a poor and meagre substitute for the infinite variety of actual life.

Stereoscopic Vision. — The visual perception of things as solid is ordinarily accomplished with two eyes. The character of the complex result, so far as the perception of solidity is purely visual, is chiefly determined by the relations which the two images sustain to each other. But in order to convert this truth in optics into a truth in psychology, all that has thus far been emphasized as to the nature of perception by the senses must be borne in mind. When such stereoscopic vision occurs with both eyes at rest, or with a single eye, the influence of fused and associated ideas derived from past experience of the eyes in motion, or from the field of touch, must be allowed additional weight. Indeed, there is every reason to hold that without such past experience, genuine stereoscopic vision, or perception of solid objects with the eyes, could not take place.

Stereoscopic vision is developed, principally on a basis of variation in those sensation-complexes, concomitant or closely successive, which are due to the stimulation of the different retinal areas of the two eyes, combined with variations in muscular and tactual sensations due to their simultaneous movement.

A railroad train lighted by an electric flash (and here there can be no question of simultaneous movement of the eyes) is still seen stereoscopically. One-eyed persons appear to have a certain amount of stereoscopic vision. The object seen by such a flash-light, however, really appears to most persons more like a photograph — *suggestive* of solidity — than as a real and solid visual thing. And, in general, our stereoscopy and perspective are so obscure and inaccurate with one eye as to support rather than to oppose the view that motor-sensations with two eyes are the chief, if not the necessary, aids to all our more distinct stereoscopic vision.

The activity of the mind, and its dependence upon memory and imagination, in the construction of its perceptions of solid objects are amply illustrated by all experiments in stereoscopy. Investigations into the wandering of the point of regard, and its accompaniment of focusing and redistributing attention ("fixating"), are in evidence here. Where the two ocular images do not promptly unite in customary ways, so as to suggest, and fuse in, the right interpretation, there is apt to be a conscious pause while *we consider* the meaning of such confusion in our sensation data. An effort of will, or an involuntary spring of imagination, often settles the confusion. Thus two systems of lines on a flat surface, when uncombined, suggest solidity only doubtfully; brought a little nearer together and they combine and become more directly endowed with spatial properties. The same two sets of lines, when united stereoscopically, can be perceived either as an empty funnel or as a solid truncated cone. By uniting a right-eyed image of a white cube in outline, with a left-eyed image of a similar black cube, we are induced to perceive the transparent depths of a crystal, etc., etc.

In all such cases *it is not merely sensing, but also ideating and discriminating consciousness, which accounts for the character of the perceived object. The fact that vision is normally stereoscopic, that double vision* *does not ordinarily take place, shows that all vision involves the selection and emphasis of certain sensation-elements, the relative disregard or exclusion of others, and the interpretation of the whole in terms of previous experience as determined by habit, practice, interest in the nature of the object, expectation, etc.*

Secondary Helps to Visual Perception. — What the practiced eyes see when they open upon a landscape, or a city street, or upon the objects grouped in a room, is by no means to be accounted for completely by referring to data already discussed. Here the complex visual field consists of many objects, in front of or behind, above or below, each other, and grouped together in certain relations of contiguity, proximity, or distance, as extended in all three of the fundamental directions of space. It is this kind of seeing which makes all the objects parts of one picture and which gives æsthetical richness and variety to our visual perceptions. It is, however, dependent upon an "awareness" which is not so "immediate" as is the more primary knowledge of the eye. It involves more of judgment and imagination; the previous mental history of the perceiver enters into his vision in a more obvious and varied manner.

Among the more important secondary helps to visual perception are the following: (1) The course of its limiting lines as determining the distance and form of the object, — particularly in the third dimension. Here the bottom lines are most important; and if they cannot be discerned or correctly judged, our perception of distance is apt to be confused. (2) Mathematical perspective, or the size of the angle of vision, is also of influence. In general, objects which cover a large visual angle are perceived large. But in general, also, the perceived size of objects does not diminish nearly as rapidly as do their visual angles. Thus Martius found that if you suspend a rod of 20 cm. in length, at a distance of 50 cm., and

with this a rod of the same length at a distance
m., the latter will appear about 0.62–1.62 cm.
an it should; under similar conditions the fur-
when the length of both is 100 cm., will appear
as 7.75–9.25 cm. longer than it should. Were
not observed, we could not perceive square
ilateral things as having their sides parallel.
osphere and (4) the size and direction of the
are of great influence. Painters deceive us
y in this way into perceiving the background of
s in their pictures as distant and yet large; and
ive ourselves, sometimes unpleasantly, in the
ay, when in Colorado we see the distant moun-
so very near. Intaglios can be converted into
ns or bas-reliefs by having their shadows reversed.
cts in the landscape look far off when the shadows
lengthen, etc. (5) But environment and com-

from the conscious sensations and immediately constructs a complete picture. What really, to actual sight alone, is that man who is walking a quarter of a mile distant? Nothing more than a little blotch of color bobbing up and down in front of a green or otherwise colored background. And yet I affirm truly: I perceive — am "immediately aware" — of a man.

Effect of Feeling on Visual Perception. — That people experience what they expect, or what they want to have occur, is commonly enough said. But the influence of feeling upon all our perceptions, and especially upon the most complicated and sensitive of them all, is something more than indirect. We hear the carriage that is to convey our friend to the station, a full half-dozen times before it actually arrives. And in spite of the relatively "cool" nature of vision, feelings of dread or of gladsome expectation, of longing or of surprise, of anger or of love, often determine what mental images shall fuse with, and control the interpretation of, the visual "mass" or "series" of sensation-complexes.

Influence of Conation on Visual Perception. — From wish, or want, to *will*, is but a single step. Conative impulse and selective attention greatly influence what we see. By an act of will the microscopist can exclude the influence of images formed upon the retina of the eye which is not looking into the instrument. The trained observer, under certain circumstances, can decide whether he will or will not perceive the double images. If a card is prepared with two right-hand images of blue and two left-hand images of red, and then the four images are stereoscopically united, in some cases the volition of the observer determines which of these two colors shall be perceived, or whether the two shall mix in a binocular image of reddish-blue or of violet.

The fixation and control of the point of regard, and all ws from this in the use of our eyes, stands for ent of will in all our visual perception.

nt Theories of Sense-Perception with the Eyes. — t well be expected, the views of Nativist and st (see p. 184 f.) come into fiercest and most determflict over the case of the eye. But it is in this what has already been said of these views proves iously true. The prevalent theory in Great ince Berkeley has maintained the impossibility ing "immediately aware" of the third dimension by the use of the eyes alone; according to its ns, stereoscopic vision implies the translation ual signs of the third dimension into terms of This is obviously false. For it has been shown organ of vision possesses, and habitually uses, a apparatus for becoming "immediately aware" of ity of external bodies, and of their relative diswriter upon one branch of the subject (Dr. Judd), "All of the results from these various experiments furnish ground for accepting the association and motor-sensation theory of visual space, rather than the contrary. . . . The sense-data presented in every case are interpreted in accordance with experience." The striking experiments of Professor Stratton in producing "vision without inversion of the retinal image" are equally unfavorable to those theories which make visual perception either a *purely* retinal, or a *purely* central, affair; and also to those which claim that visual directions are determined by *purely* muscular evidence. On the other hand, they favor the view that fusion and association of both muscular and retinal sensations determine a complicated system of "local signs" whose interpretation is dependent upon ideas gained by the entire development of our sense-experience.

Uniting and Harmonizing the Fields of Touch and of Sight. — The truth just established has an important bearing upon the union of the two great classes of perceptions of external and extended objects. The world of things *is* a world seen and felt, to which *we attribute* the production of sounds, tastes, and smells, as well as of many of our various pains and pleasures. In the full-orbed perception of things by the senses it is necessary, then, that sight and touch should unite and harmonize. Considered originally and by themselves, sensation-complexes of touch are no more *like* sensation-complexes of sight, than are either of these like sensations of taste or of smell. Nor are the various kinds of sensations which come by touch, such as those of pressure and temperature, similar in quality. But amongst sensation-complexes which are always experienced together, such a fusion early takes place as makes it difficult to disentangle them even by the most subtle and persistent analysis. This is true of temperature and pressure as entering into perceptions of touch. It is more obviously true of the motor sensations of the eye and sensations of light and color as entering into perceptions of sight.

Between perceptions of sight and perceptions of touch

ral a less complete union and harmony is early
The constant use of hand and eye together by
nt secures the beginnings of the unifying process.
handles, and so knows with active touch, that it
s also by sight. Thus the two classes of percepts
closely associated. The "association" rarely or
nounts to that closer and more inseparable kind
which we have spoken of as a "fusion" of sensa-
d ideas. It is perhaps more consonant with expe-
hen, to say that one class of perceptions *suggests*
r. For example, visual volume "suggests" tactual
etc. But by this it must not be understood that
gestive process itself comes into consciousness.

asons which slight reflection makes obvious, touch
ht, respectively, either take the lead or are led, as
rds with the practical ends of perception. In the
on of distant objects sight is necessarily most
nt. Yet the blind have their kind of perception

how that particular thing looks. On the other hand, the purest visual perceptions of distant or of strikingly colored objects are usually tinged with suggestions of how it would feel to go to them; or of how they would feel, if only we could examine them in contact with our bodies.

Thus all perception, as a seemingly "immediate awareness" of external and extended objects, in the case of persons that have used both touch and sight, implies the unifying and harmonizing of the two kinds of sense-experience. In the perception of the masses of our own bodies, whether at rest or in motion, and in the perception of the solidity, impenetrability, weight, inertia, etc., of other bodies, touch takes the lead; but suggestions of sight are blended, in subordination to the data furnished by skin, muscles, and joints. In the perception of the shape, size, and spatial relations, of distant bodies, the reverse is true. Sight leads, and suggestions of touch are subordinated. *In all cases, the practical ends of perception largely determine which spatial sense shall lead, and how the unifying and harmonizing process of construing the object shall take place.*

THEORY OF ILLUSIONS AND HALLUCINATIONS OF SENSE

All that has thus far been said about normal sense-perception, and much which will be said about memory, imagination, and reasoning, is illustrated and enforced by a study of illusions and hallucinations.

Illusions and Hallucinations in Normal Perception. — It was formerly customary to claim that our senses never deceive us; only our judgments, it was held, can go astray. Even a recent writer (James) has said that such fallacy is not "of the senses proper." It will subsequently appear — indeed, in our discussion of attention, discrimination, and the very nature of perception, it has appeared — that neither truth nor error can be claimed for "the senses proper." Only judgment can be true or false. But as to sense-perception in general, the saying of Lotze is more correct: "The whole of our apprehension of the world is one great and prolonged deception."

It is well understood by students of pathology that illusions and hallucinations of all the different senses occur in cases of insanity and other diseased conditions. Investigators within the realms of so-called "psychic phenomena" well know the influence of suggestion, in its infinitely varied forms, to produce the "immediate awareness" of all kinds of illusory objects. This influence is made especially striking in experiments with hypnotic subjects. What has not been so universally recognized is this: *In the normal waking life of the average man a large but indefinite amount of illusion and hallucination enters into all his sense-perceptions.* If we make the customary distinction and consider "illusions" as partially false interpretations of really existing sensory data (and so as having at least a partial peripheral and external origin), and "hallucinations" as purely central and imaginary constructs, we must say that both belong to the average man's so-called "normal sense-experience."

The presence of illusory elements — and often in a dominating way — within all kinds of normal perceptions is precisely what our theory of perception compels us to expect. *For all perception is interpretation; and from partial or mistaken interpretation all degrees and kinds of illusions and hallucinations result.* Ordinary experience amply confirms what correct theory suggests. Experiment also demonstrates the presence of *measurable* illusions and hallucinations in the normal life of perception by the senses. Such a series of experiments recently conducted (by Dr. Seashore; see "Studies from the Yale Psychological Laboratory," 1895) led the experimenter to the following conclusions: "What we call normal perception involves many illusory influences — not only those of physical and physiological origin, but even more so those due to the functions of ideation, memory, and imagination."

Illusions of Taste, Smell, and Hearing. — It is well known that the hypnotic subject can be made, purely by suggestion, to exhibit all the signs of having nauseating and disgusting, or delightful and invigorating, tastes and smells. Told that the glass of pure water, from which she is drinking, is ink, she can scarcely refrain from vomiting; but told that it is lemonade or wine, she not simply simulates, but actually feels, the expected refreshment or invigoration. Suppose that the experimenter, in determining "the threshold" of sensations of sweetness, having found that a ½ per cent. or 1 per cent. solution is detected on first trial, wishes to deceive the normal subject. He can, almost without exception, make him perceive the sugar on tasting pure water the requisite number of times with the appropriate suggestions. The same experiment succeeds with the smell of oil of cloves instead of the taste of sugar. *The influence of suggestion, and the amount of the illusory factor, in the cases of the hypnotic subject and of normal perception, is only a matter of degrees.*

How people imagine all manner of sounds and of voices addressed to them, that have no accurately corresponding external stimulus, is too well known to need detailed illustration. The whole account of our dream-life, so far as it can be given in terms of audition, depends upon the influence of similar illusory and hallucinatory factors. The mother who hears her dead child calling to her may be neither more nor less truly projecting and localizing and interpreting, in an ideal way, certain sense-modifications of her consciousness, than are you and I when we converse with one another. The experiments already noticed claim to have established these two points: —

allucinations of sound distinctly above the threshbe produced experimentally in normal life by he observer to concentrate expectant attention desired result.

xperiments to determine the threshold of sound continued through a series of repeated trials, being vitiated by the suggestion due to the ting associations."

s of Touch. — The effect upon perception of crossfingers and feeling some small object between remarked as long ago as Aristotle. Only the perception which recognizes it as an activity of ating consciousness in interpreting local signs become fused and associated into a fixed spatial ccounts for even this simple experiment. But f this theory, the question becomes: Why should llusion take place? The illusion is, under the nces, the normal perception; it is the *external* pound of feathers in terms of sight, then it ceases to be lighter than the pound of lead. Experiment also shows that the illusory effect of the suggested idea often persists even when clear knowledge is obtained as to its presence and deceiving effect. Though we know that the smaller of two otherwise similar cylinders weighs no more than the larger, we cannot perceive them, when lifted between finger and thumb in plain sight, to have the same weight. The illusion persists, so strong are the established associations, although with diminished effect.

Illusions and Hallucinations of Sight. — Illustrations of the truth that the explanation of all cases of incorrect interpretation of the local signs (illusions or hallucinations) is to be found in the principles of normal perception are most frequent and striking in the case of sight. This is because of the very nature of visual perception. Its systems of local signs are most complex and subtilely variable, and yet most intimately fused and associated. The resulting perceptions are, of all others, the most complicated and yet firmly established. We are always attentively engaged in perceiving or ideating visual objects, as a necessary means to the attainment of our practical ends.

When an attempt is made to explain psychologically the illusions and hallucinations of sight, whether ordinary or unusual, we are often met by the fact that several principles of normal vision are needed for a complete explanation of some particular case. Hence the same sensation-data may result in different illusions in the perception of different individuals. On the contrary, the explanation of similar illusions may be different in the cases of different individuals. It is these considerations which make it so difficult to mass all the experimental data in defence of any one law of visual errors of perception. The following pages of illustrations and the

ying text will show some of the principal appli-
f the general theory. The theory may now be
in this figurative way: *It is the acquired fidelity
usness to fact and to law which produces our illu-
hallucinations; for the object is always a mental
on, a solution by discriminating and interpretative
ess of a problem proposed in terms of sensations
presentative images.*

visual illusions are explained by the principle of "*con-
lors or of lines and contours.* If we place two differently
res on a card and then unite them with a stereoscope, one
l be seen to "prevail" over the other (sometimes according
of the observer); or else the two may fuse in a third color
om both. With this strife of colors a strife of lines or
may be combined. If, for example, two series of outlines,
nd one black, be stereoscopically seen, we have the illu-
ansparent solid.

Frequently combined with this effect is the working of an allied principle. In measuring any space with the eye, if the space is broken up with points or lines, or is filled in with a number of objects, there is a slight tendency to pause at each interruption of the process of measuring; and this tendency requires work in order to overcome it. Hence squares intersected with lines (see Fig. 19) appear enlarged in the direction in which they are repeatedly intersected; and the same thing is true of angles (as in Fig. 20).

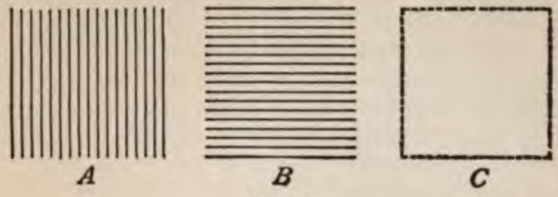


Fig. 19

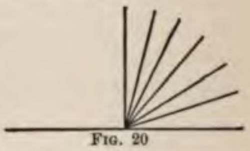


Fig. 20

3. The *tendency to prolong the motor activity* in the direction in which it has already been continuously exercised, in connection with the preceding principle, accounts for other visual illusions. In running the eye along a line or a surface, a sudden check to its movement, or an encitement to move in the reverse direction, tends to shorten the apparent magnitude; but an encitement to continue the movement in nearly the same direction increases the apparent magnitude. This is the principal reason why, in Fig. 21, of the equal lines *A*, *B*, *C*, and *D*, the line *B* appears longer than *A*; but *C* appears longer than *B*; while it is quite impossible to persuade ourselves that *D* is not much longer than *A*.

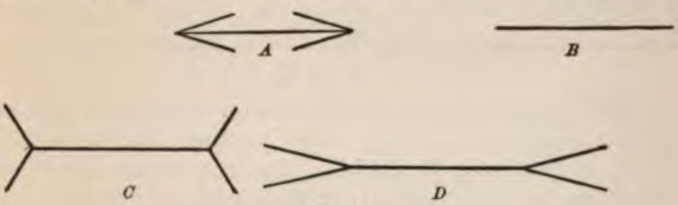
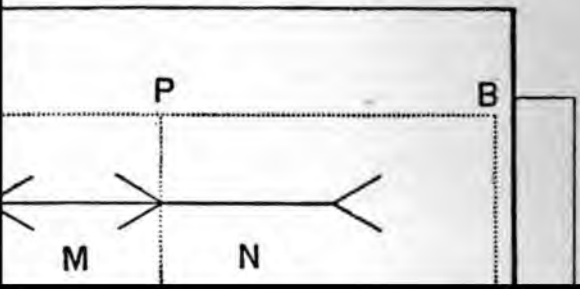


Fig. 21

[The foregoing principle can be illustrated experimentally by preparing an "illusion board" after the pattern of the following diagram (invented by Heymans; for a full description see Scripture,

Psychology," p. 400), in which, by shoving in and out one
the board, the accuracy of our measurement and the
illusion can be determined (see Fig. 22). Schoolboys
illustrate principles 2 and 3 when they try the trick of
e cents along a line so that the distance between the outer
nd *B* shall equal the distance between the inner rims of
In the figure on the next page (No. 23), the distances *are*,
neans *seem to be*, exactly equal. Doubtless also, the ten-
cate any symmetrical small body about its centre, and
sure the distances between *A* and *B*, and between *B* and
centres rather than by the rims, enhances this illusion.



the trees in the next field. Other more complicated ideas and doubtful but conscious estimates enter, however, into such illusions of sight.

Fig. 28

6. Under certain circumstances *the more creative activity of the image-making faculty*, taking its start from meagre sensation-data and following the principle of suggestion, results in astonishing illusions and hallucinations. Thus Binet tells of a hypnotic patient who, having the suggested hallucination of a portrait on a sheet of paper on which a rude figure of a hat had been drawn, perceived the suggested portrait wearing the actual hat. The visual sensation-stuff which suggests our elaborate dreams of seeing things is customarily equally meagre. Similar illusions enter into all our normal perceptions. It has already been repeatedly shown how in all visual perception, unless it is deliberately minute and careful, the few sensory-motor data serve as suggestions which are filled in with a rich content of revived images. No wonder, then, that the result is so often illusory.

Education of the Senses in Perception. — Our rather long study of the development of sense-perception may well end by stating two principles which concern the educative value of the senses: (1) The development of perception by the senses is *mental* development; and the education of the senses in perception is, therefore, education of the entire *mind*. (2) We have no other way of arriving at an assumed knowledge of things than to take our start with the careful training of the senses in perception. This is the way to separate between truths of fact and the manifold illusions and hallucinations that mix with all our sense-perceptions. A guilty conscience and a disordered function of the organism explain Macbeth's vision, which is but

> "A dagger of the mind, a false creation,
> Proceeding from the heat-oppressed brain."

nowledge of things" is, as we shall see later on,
eans wholly a matter of sense-perception.

upil should study some book giving the "physiology of the
ch as that by M'Kendrick and Snodgrass, or the author's
of Physiological Psychology. Of the larger psychologies
nent of the subject by James: Principles, II, pp. 76–324,
best. This may be supplemented by Bain: The Senses
Intellect, pp. 59–100, 159–190, 360–448; Scripture: The
hology, Part IV, "Space"; and Sully: The Human Mind,
–235. The monographs on the subject are almost innu-
among them may be noticed, Max Dessoir: Ueber d. Haut-
é: Sensation et Mouvement; Stumpf: Raumvorstellung; T.
t: Sight and Touch; Le Conte: Sight. Edmund Parish's
Illusions and Hallucinations may be consulted with profit.
ect may be experimentally studied by "Bradley's Pseudop-
e apparatus prepared under the direction of Professor Mün-
The advanced student will, of course, resort to the more
treatises of Wundt, Helmholtz, Hering, and others.]

CHAPTER X

MEMORY

The processes of ideation, by fusion and association under the principle of contiguity (see chapter VII), lay the basis for the development of the three so-called "faculties" of Memory, Imagination, and Reasoning. These faculties do not, like perception, seem to make us "immediately aware" of things, of their qualities and their relations. In memory we have *ideas* of things once perceived; in imagination we make useful or fanciful combinations of these *ideas;* and in reasoning we rearrange these *ideas* so as to increase our knowledge about things. *Re*-presentation is, then, dominant in all such complex mental processes. In all three forms of representative faculty objects, once immediately known, are *presented* to consciousness *again, in the form of ideas.*

On the other hand, attentive and discriminating consciousness, self-selecting and self-directed, in the pursuit of practical ends, is implied in all memory, imagination, and reasoning. For these faculties are not mere resultants of increased complexity in the processes of ideation. And the development of mental life along these cognate lines of activity depends upon something more than upon a bare increase of complexity in such processes. This is especially true of imagination and of reasoning, whose essential character seems to consist in giving us something new, something beyond that of which we can become "immediately aware" by sense-perception.

Of these three forms of the development of mental life, we consider first —

ature of Memory. — When we remember, some past
ıce of our own reappears in consciousness in the
ideas. But the following particulars are illus-
y every complete act of memory: (1) It is itself
in the stream of consciousness. It is my activity,
, of remembering; and, therefore, I immediately
am aware" of, "feel sure" of, — with more or less
d strong conviction — the truth of what I thus
represent. Memory is thus a species of know-
(2) The actual event, which I represent in con-
ss, is known as belonging to time now past. The
ctually *was* — a year, an hour, a moment, ago.
implies, then, some development of "time-con-
ss." (3) The actual event, like my present
rance of it, was an experience of mine. I can-
ember another's experiences, unless I have already
what those experiences were, and have made them
. Memory implies, then, some development of

tion and reproduction, since the former takes place entirely, and the latter partially, outside the stream of consciousness, belong to the *conditions* of memory, rather than to the psychosis itself. They are not, then, properly speaking, "stages" of psychical memory. So far as reproduction takes place in consciousness, it is itself nothing but the actual process of remembering, whether conducted in an automatic or in a more or less consciously purposeful way. The simple and fundamental fact is: *I remember;* — that is, *a modification of my present conscious mental life appears, which includes the conviction that it represents some past event in the same mental life.* But in order to understand this fact, we may consider it from three points of view: it implies retention; it implies reproduction; and it is a true recognition, or "knowing over again."

Memory as Retention. — The word *retention* cannot be applied to any genuine psychical act or process whatever. The mind may not be conceived of as a thing which can retain, or hold, as under lock and key, its store of acquisitions. Neither is it like a lump of wax, or of putty, which keeps the impressions made upon it by contact with various things. And, indeed, essentially the same thing is true of the brain. The physiological principle of "dynamical associations" among the elements of the nervous system, and the cognate psychical principles of habit, and of the renewal of the ideation-processes under the laws of fusion and association, are the preconditions explanatory of the phenomena of memory, regarded as retention. *As distinguished from these laws of reproduction, which are themselves to be regarded as necessary conditions of recognitive memory, there is no such thing known to scientific psychology as "retention in memory."*

What is popularly called the "retentive power" of memory — the figure of speech which seems to teach that memory-images are

away — has been conceived of in two ways, physiological
ological. Thus Plato and St. Augustine regarded the ideas
uing to exist somehow in the mind. And even Bouillier
"No idea, at least of those which memory may recall, ever
mind entirely." Truer to science is the poet Longfellow:

"Themselves will fade,
But not their memory,
And memory has the power
To recreate them from the dust."

nsatisfactory with Plato is the modern physiological theory
nks to explain recognitive memory by referring to "scars,"
, or "polarized nerve-cells," or "association-tracts" in the
h the added phenomenon of consciousness.

logical Conditions of Retentive Memory. — Little need
d on this subject to what has already been said
f.). The special conditions of an act of memory,
l as implying retention, are to be found (1) in the
n of the centres and association-tracts of the
here the original presentation occurs, and also

physiological conditions. Thus after fevers, much of one kind of knowledge may be lost, while another kind is retained. Forbes Winslow even tells of a man who, on recovery from an illness, had forgotten the letter F. In general, as says Kussmaul, "the more concrete the idea, the more readily the word to designate it is forgotten when memory fails."

Psychical Conditions of Retentive Memory. — What we remember at all, and what we remember best, depends chiefly upon the relations which attentive and discriminating consciousness sustains to the processes involved both in the original perception and in the reproduction. Among such relations the following are important: (1) The vividness of the impression, and its attraction to itself of "interest," in the first instance; (2) the sympathy with our permanent disposition or temporary mood at the time of acquisition; (3) the thoroughness with which the memory is wrought, by repetition, into the texture of our mental life; (4) the favoring or unfavorable direction of our practical ends; (5) the amount of voluntary effort given to "fixing the thing in mind" or "committing it to memory"; (6) the firmness of the logical connections between the particular event and our established principles of judgment or habits of conduct. Events that stand well in these and similar ways as related to our entire mental life are likeliest to survive the obliterative influence of time. They constitute the permanent retentions of memory.

In spite, however, of these undoubted psychical laws which control memory considered as retention, there are not a few phenomena which appear not to conform to them. On the one hand, some things which we have taken most pains to commit to memory, have been most interested in, most sympathetic with, and which our pursuit of practical ends most binds us to remember, slip provokingly, beyond all recall, from our mental grasp. On the other hand, the train of consciousness is not infrequently seen to be loaded with worthless, grotesque, and offensive rubbish, whose existence and recurrence in the stream of consciousness seems to defy all laws. Clinging "parasites" of memory, they seem to be; and how frequently do they possess the choke the trees which we most wish to cultivate! Again g fact springs, unbidden, into full consciousness out of the lepths of a forgotten past. Thus Delbœuf tells how he f *asplenium ruta muralis*, although he was no botanist and ow that such a plant existed; only subsequently he discov- wo years previous to the dream his eye had rested thought- n instant, on this collection of, to him, meaningless words. a kind of retention in memory which psychologists have but to which we shall give the title "metamorphosed," — emory-image kept in mind in a form of substitution. Thus has failed to execute a commission, or to do an errand, or has left behind one's book or one's umbrella, a sort of vague uneasiness gives a peculiar shading to the stream of con- This is chiefly due to the fact that this stream of conscious- not correspond to the idea previously formed of what it Such an idea lingers in the "fringes" of consciousness as memory-image of a certain place to be visited, or thing to as a vaguely felt system of pressure and other sensations weight we were carrying, etc. Apparently such "meta- " memory, or substitution of obscure allied feelings and clearly recognized and definite images of another kind, Yet the application of these principles is modified in the development of memory, when ideation becomes *a reknowing of past experiences*, by the following considerations: (1) The reproductive processes are brought under the control of the mind in the pursuit of its practical ends. *We recall* one event, rather than some other, in order to make use of the memory for carrying out some purpose of ours. "Recollection" — or the gathering together again of the factors which have previously been together in the psychosis — may be a voluntary and purposeful reproduction. (2) The development of imagination and of intellect profoundly modifies the reproductive aspect of memory. Imagining "how it was" influences the processes which restore, or reproduce, the event in memory. Thinking "about it," or thinking "how it must have been," both guides and checks the same processes. (3) The acquisition and use of language also modifies profoundly the character of the reproductive processes. A high degree of speed and of accuracy in the recall of past events could not be attained without language. Words are compacted memories. Every word is fraught with a score, a thousand reminiscences. By remembering words we are able to remember things and to *re*-cognize them. By the use of words as a support for the reproductive processes we attain (*a*) the better recall of our past experiences in their connections, and (*b*) the possibility of that varied and expansive kind of memorizing which belongs to conceptual knowledge.

The development of memory as reproductive depends upon the three foregoing considerations in so important a way that each of them demands a brief separate mention.

Memory as Voluntary and Practical. — Life consists largely in the pursuit of practical ends under the control of will. But the pursuit of ends requires us to learn how to use the means which alone can make the pursuit successful.

s implies the gaining control of the reproductive
s. In connection, then, with the gradual develop-
memory all the characteristics of the elementary
processes, as they become fused and associated,
ght into play. But *the processes of ideation are*
and more as memory becomes a developed faculty,
ted to control in the pursuit of chosen ends.

ning to walk, to talk, to measure distances and perceive
eye or hand, the intellectual activity of the child is em-
n a basis of reproduced sensation-complexes. These sen-
plexes must be recalled in idea and used to guide the
f the child in the attainment of the practical ends —
, talking, and of knowing and using things. But the
his reproduced sensations becomes constantly more con-
d the individual sensations more schematized, as it were
pp. 142 f. and 150 f.). By and by it is, as in the case of the
sician, but a "leap" from certain black lines and dots to
x motor activities which the vocal organs, or the hand and
t execute in order to produce the correct tones. Yet a close
f the 'cellist, for example, will detect him reproducing by

upon the reproductive function of developed memory. In fact, a very large part of adult memory is "word-memory"; and the development of memory is in large measure the development of "language-memory." We carry about with us, so to speak, all our very prolonged and complex experiences done up in verbal packages. We only reproduce the *story* of them which we long ago committed to memory; we do not reproduce *themselves*. Sometimes, when we have time, we sit down with ourselves and "live them over again" in memory. But ordinarily all our past experiences, when revived, only bear the scanty conceptual form to which they have been reduced when consigned to word-memory.

Certain phenomena in reaction-time confirm the advantages of word-association and word-production. Thus Münsterberg found that the answer to such a question as, "On what river is Cologne?" occupied 808 σ to 889 σ; but the proposal of a question in the form, "Apples, pears, cherries, etc., which do you like best?" shortened the time to only 694–659 σ. In all cases certain words in our questions are *full of memories;* but if these "memorable words are got before the mind" early in the question-sentence the act of reproduction and the following choice is completed more quickly.

Moreover, words are remembered as connected into sentences, propositions, trains of argument, tales descriptive of past experiences. Thus the memory of one part of our experience tends powerfully to reproduce the connected whole. The memory of the number of a certain proposition in geometry, or of the words "*pons asinorum*" or "binomial theorem," may *store* for ready reproduction a whole train of associated ideas. Indeed, language-memory constitutes the principal portion of our stock ideas bound together and made ready for rapid and firmly connected reproduction.

Nature of Recollection. — Highly psychological languages distinguish between active and merely passive reproduction. (For example, in Latin we have *reminiscor* and *memini;* in German, *Erinnerung* and *Gedächtniss;* in French, *souvenir* and *mémoire.*) The distinction is not absolute; and we have seen that intelligent control of the tive processes enters into the development of the culty of memory. But we are sometimes well intelligently and deliberately trying to reproduce and of succeeding more or less perfectly in our

eculiar feature of this kind of memory is, that *attention considered as a selective and distributive orking toward an end consciously conceived, con- time-rate, order, and completeness of the repro- rocesses in the interests of that end.*

llowing considerations serve to distinguish the those modifications of consciousness which are ized as "trying to recollect": (1) In recollection l is conceived of as being served by the repro- rocess. But this setting of the end of recollec- re the mind is itself an act of memory. We y to remember, unless we already to some extent r — enough, at least, to know what it is we wish to or suffer the reproductive process, which is sometimes called "putting the thing out of one's mind." Men of strong character acquire unusual facility in refusing attention to things they desire to forget, — the same effect, though gained in opposite way, which comes to the weak mind from lack of concentrated attention. Kant is said to have written in his journal: "Remember to forget Lampe" (his faithless and discharged servant).

Influence of "Atmosphere" and of Feeling. — More powerful than our own wills to control the reproductive processes are, oftentimes, our physical or social environment, and our condition as respects quickened or deadened feeling. The "systematic association," to which some writers would reduce the laws of the reproductive activity of the mind, is not governed by practical ends alone. We must recognize a sort of artistic inclination to make our memories fit the present surroundings. To this artistic harmony between memory and the "atmosphere" with which perceptive consciousness surrounds us, we owe in part the fact that —

> "Each substance of a grief hath twenty shadows,
> Which show like grief itself, but are not so."

The adult man, on returning after long absence to his boyhood's home, finds the environment recalling a hundred forgotten incidents of his early life. Whereas the traveller in wholly foreign scenes — for example, on a first visit to Japan — is scarcely able to suit his memories enough to his own past to seem "like himself."

In the "hunt" for particulars stored away in memory, the effect of the present arousement of feeling is often especially marked. From the physiological point of view we are then made to witness the effect upon the reproductive processes which comes from having the entire brain-mass excited to unwonted activities. In certain great historical speeches — as, for instance, that of Huss before the Council of Constance — the whole of the speak-

experience seems to be placed, under the impulse
ional excitement, fully at his command. Philo
tells us how his "inspirations" made memories
ghts fall like an overwhelming shower upon him.
e mysterious and peculiar *mental* activity involved
velopment of this faculty becomes apparent only
consider —

y as Recognition. — *In a complete act of developed*
on the present psychosis is consciously related to the
rience of the subject as representative of that past.
ious retention — whether conceived of as a "hold-
tore" of certain cerebral habits and dynamical
ons, or as a "keeping" of ideas within a meta-
entity called the mind — might be absolutely
and yet no actual memory-consciousness develop.
ction might be secured in perfection, and might
rever, and yet no faintest shadow of a true re-
nce pass within the soul. Memory, in the full
of the word, is a *knowing* of the *past*, and of *my*

belonging to *my* experience. It is something formerly known to, or having happened to, my *Self*. A continuity of experience, a stream of consciousness, of all of which I am the one subject, is, therefore, implied in recognitive memory.

Recognitive memory, indeed, involves the consciousness of time, the consciousness of Self, — both developed to a certain extent, — and growth in the activity of discriminating consciousness as the faculty of comparison and judgment; but recognitive memory is no mere compound of all these. In the full development of this faculty we distinguish a form of cognitive activity which is more than mere reproduction without recognition, or mere assimilation without the consciousness of time and of Self. Mysterious as it may seem, the admission must be made: *I transcend the present and, by a truly spiritual synthesis, connect it with the past into a unity, in every act of developed recognitive memory.*

It is obvious that memory cannot be explained as though it were a *mere* succession of images, or a *mere* succession of consciousness of any kind. But, just as obviously, the degree of recognition — the amount of clearly conscious representative cognition — which belongs to different acts of memory, varies greatly. This is because the faculty of memory, like every other form of mental life, is itself subject to the laws of development. The memory of childhood is relatively lacking in recognition. It is more mechanical, more deficient in those qualities which depend on time-consciousness, self-consciousness, and maturity of judgment. Many adult reminiscences are only faintly recognitive. Very often memories and imaginations, so intermingled that we can scarcely distinguish them, troop arm in arm across the field of consciousness. Nevertheless, we know what it is to challenge the authority of our own mental images; and to come to the clearest consciousness that *this particular event did actually occur in our own past experience.*

Acts of conscious reproduction which terminate in some form of recognitive memory must, therefore, be distinguished from those which do not thus terminate. Thus, for example, the meaning of

doubts itself, so to speak. The "clarifying" of
re becomes then a problem, whose emotional
iments offer a strong *motif* to attempt its solu-
e process of recollection, as already described,
en the legitimate solution of this problem. If
ss terminates favorably, then the recall into
ess of the clear and detailed memory-picture,
l in and believed in, becomes an established and
emory. Thus *we confirm memory by other mem-*
n indestructible confidence in good memory as the
of the correctness of all our developed discrimi-
sciousness.

ial influences are, however, exceedingly impor-
e verification or correction of the individual's
If nineteen of twenty men who have witnessed
event remember it one way, and the twentieth
different way, the bare fact of being in such a
inority will influence the twentieth man's trust

the majority. Yet the one man might be alone in remembering the most highly improbable thing, and also be alone in remembering aright.

The summing-up of the matter for the psychologist is this: while recognitive memory is knowledge, and without trust in it, no knowledge at all is possible; still knowledge itself is so complex and subtly variable an experience that it cannot escape the principle of development. To this thought we shall return later on.

Loss of Memory. — Reference has already been made, in a general way, to the physiological explanation of the loss of memory. The detailed explanation of the astonishing peculiarities which some cases exhibit, seems thus far to be beyond the power of both physiology and psychology. The psychological theory can only resort to conjectural combinations of those principles which have to do with so-called "committing to memory," "retaining in memory," and with either involuntary recall by association of ideas or voluntary recollection. By such combinations we are able to conjecture why one thing is lost, either temporarily or apparently permanently, while others are retained, etc.

The physiology of the representative processes is made more obvious by the modern discoveries in "the localization of cerebral function." These discoveries will be briefly given in a later chapter. It is enough at present to say that they show how an almost indefinite variety of forms is possible in the impairment of that soundness in the cerebral centres, and in the normal functioning of the association-tracts, which is necessary to memory. On the psychological side, the general truth should be borne in mind that loss of the memory of many things is necessary to the retention and reproduction of other things. Memory, as recognition, is always of *some particular experience;* but imagination and thought are rather forms of the representation of "the universal." Good memory conin the possibility of reproducing all our experi- ut in the ability to recall those that are adapted to of mental life.

tion of Memory. — All sound and safe training of must, of course, proceed according to established gical and psychological principles. Of these, the g are among the most important: (1) The acquire- a phenomenally retentive and spontaneous memory ssible for the average man. The very character brain-structure and of its functioning prevents us from becoming prodigies of memory. Over- oss of valuable energy needed in other directions, eral mental decline, surely result from the attempt cultivate this faculty. On the contrary, (2) to he general conditions of a sound brain and a nind is to prepare the way for the best training ory. (3) The control of attention, as quickened same thing when the "stores" of the memory of some person who is temporarily "off-guard" are unloaded before our eyes; or when the shallow and faithless character of past acquirements is revealed by the failing and false action of voluntary recollection.

Systems of mnemonics are safe and valuable only as they follow the foregoing laws. The best of them are most available in giving one the ability more easily to keep in mind, for a temporary purpose, a multitude of disconnected facts which it is desired to handle in the interests of some particular occasion or cause. In so far as they interrupt or divert the "natural life of the mind" and load it with petty and grotesque details, they are harmful.

Important maxims to be observed in the training of young children may be based upon the experimental results of Ebbinghaus and others. Such are, (1) Do not undertake too long tasks of memorizing, in one effort, as it were; (2) Find some meaning in what is memorized, so that it may be connected with the rest of experience in an intelligible way; (3) Repeat, with fixed attention, until the thing is "fastened in memory"; (4) Bear in mind that a really good memory cannot be secured without cultivation of the powers of perception and reasoning. Nor can a *good conscience* be left out of the account.

[In addition to works cited at the end of Chapter VII, the pupil may consult; Articles in the Am. Journal of Psychology, II, i–iii, by W. H. Burnham; Sully: The Human Mind, II, Appendix D; Taine: De l'intelligence, II, i–ii. On the training of memory, see Edridge-Green: Memory and its Cultivation; Holbrook: How to Strengthen the Memory; and Kay: Memory, What it is and How to Improve it.]

CHAPTER XI

IMAGINATION

ıpared with memory, that development of the life entation which is called "Imagination" stands ı a higher, and partly on a lower, intellectual magination is not a re-knowing of what was s recognitive memory professedly is; it, there- ıds in no such immediate relation to the acquisi- ıowledge. And yet the extension of knowledge ıigher ranges, the passage from the seen to the rom the present in time and space to the distant uture, makes strenuous demands upon the image- faculty. It is not inventors, artists, and poets this belongs to the stream of consciousness whether one is trying to recall the castle of Kronberg or to build one's self a "castle in the air"; whether one is remembering how one felt when made the subject of detraction, or is trying to imagine how Beethoven must have felt to find his work treated in similar way. On the other hand, the most sober acts of imagination differ from the most uncertain and flighty attempts at recollection, in that (*a*) the former are not accompanied by that added consciousness of a reference of the mental picture to past experience, which the latter have; and (*b*) the former are not accompanied by belief in the known reality of their objects, as the latter are.

Imagination is, then, a development of ideation or image-making considered as, to some extent, set free from recognized dependence upon previous experience with the actual behavior of Self or of things.

Physiological Conditions of Imagination. — All our imaginings are doubtless connected (as the very word "reproductive" suggests) with the recurrence of physiological processes, both of the brain and of the external organs, that are similar to those involved in the "immediate awareness" of the same objects. Pathology and experiment indicate that the brain-centres involved in perceiving and in imagining visual objects are the same. They also indicate that other centres may be regarded as chiefly concerned in audition — whether this be a perceiving of the meaning of sounds heard or an imagining of sounds. Both experience of the ordinary type and carefully guarded experiment prove that the motor activities of the external organs — eye, hand, tongue, etc. — which are needed for a complex process of imagination are similar to those employed in the perception of the same class of objects.

When Kant urged that, in order to *imagine* a straight line one must *draw* it, he appealed to this fact of experience. Indeed, to know ight line really is, one must conceive of a passage from A hat is, without turning aside) to B; and slight inchoate and strains of the eye, or of the arm, are originally involved of "conceiving." Stricker has proposed to test the dependagination on motor consciousness by defying us to image a hich labials or dentals are prominent (like "bubble" or with a perfectly motionless, wide-open mouth. An admirer Garrick once praised his wonderful gift of imagination by he "appeared to be present in all the muscles of his body." nent and suppression of secretions, the production of burnstigmata, in the case of hypnotic subjects, by the influence d image-making, is in evidence here.

plete physiological conditions of a complex act of imagination lve both centrally initiated ideation-factors and also motore latter both centrally and peripherally reproduced.

ation as Reproductive. — The distinction often tween reproductive and genuinely productive, e, imagination is only relative. It is like the n made between the "original" and the unthinker. Certainly, all acts of imagination, erations in view, the different imaginations of men vary widely in their more reproductive function. Dreamers, children, the insane, the most reasonable adults when indulging the play of fancy, "let go" the mental images. Now the soul is a great artist, a most astonishing inventor of stories. And, when freed from the restraints of perceived environment or of remembered fact, it "runs riot" in fancy and enjoys the "rout" of its own image-making.

But, on the other hand, most adult and waking imaginations bow in some form to the laws of association as dependent upon perception, memory, and thought. Hence arise both the common sense and the bigotry which characterize the imaginative products of the ordinary man. Not only is this faculty unable to "play" freely, but it cannot even "work" freely enough to enable its owner to form the picture of how men of quite different past experiences have thought and felt and acted. The views and feelings of **B**, who belongs to the political or religious party **X**, are "beyond the imagination" of **A**, who belongs to the political or religious party **Y**.

In many dreams a very meagre amount of sensation-"stuff" excites the imagination to weave about it a most wonderful story. A straw between the dreamer's toes was imagined as the assault of robbers who impaled their victim through the foot; the asthmatic sleeper's distress for breath was imagined as the horse of the *diligence* in which he had been riding, that had fallen and lay panting and dying. Often chaos reigns, rather than the lowest order of dramatic unity, among the dreamer's imaginings. Thus Grüithuisen tells how he once imagined himself to be riding a horse which immediately became a buck, the buck became a calf, the calf a cat, the cat a beautiful maiden, and she, an old woman. The pictures drawn and the speeches or poems composed by certain insane, whose disease resembles a perpetual dream, illustrate the same unrestrained riot of image-making faculty. We are told of a Russian nihilist, long imprisoned, the creaking of whose slippers, as he paced his cell, was imagined to be "the haunting voices of damned fiends." *In such cases reproductive imagination is more like illusory perception than like recognitive memory.*

not need to resort to the experiences of sleep or of the mad-
now the disadvantages, as well as the advantages, of a "hide-
nagination. Unrestrained image-making faculty runs riot
t a bigotry, which is quite as far from the actual richness of
and of the world of things, results from excessive restraint
tion. The "Bourbon" and the "Philistine" may miss of
through defective imagination, as truly as the insane person
is riotous fancy. Thus the man of common-sense cannot
at water can burn; very much as the king of Siam is said
en unable to conceive of water as becoming solid enough for
o walk upon. It can scarcely be denied that the difficulty
, in general, experience, because they persist in trying to
sensuous terms the atoms or the waves of luminiferous ether,
r belief in these alleged entities. Mr. Spencer's impossibility
ving" the Absolute seems to us of a quite similar origin.

ation as Creative. — In all imagination something
reated or made. But this new creation employs
terial the mental images which have their origin
experience. *In all so-called "new" creations of*
ion the mind takes its point of starting from memory-

picture of the new unity or "ideal" to be reached by the mental activity; and so (5) an end, which has practical or theoretical import. For so-called *creative imagination is always teleological; it is constructive according to a plan.*

The achievements of the productive imagination range all the way from the play of children or a cook's new *ragout*, to the discoveries of the astronomer or the speculative insights of the philosopher. In all these achievements the laws of association, the limits of perception, and the constitution of the intellect, are to be discerned. But in them all there is still an element of mystery. Even in the play of children the well-known principles of imitation and association do not explain everything. There are sources of origin that lie in the hidden depths of obscure impulse, or instinct, — the mind's forthputting of ideas, the significance and value of which are not yet objects of consciousness. It is not strange, then, that Mozart's father acknowledged "a gift of God," when his son played, at first sight, the grand organ; or that the same son afterwards could give no account to himself in answer to the question: Whence came the immortal melodies which kept sounding in his ears?

The Limits of Imagination. — While, then, we must acknowledge the dependence of the most purely creative imagination on the acquisitions and the associated revivals of past experience, it is not safe to set arbitrary limits to its inventive and intuiting functions. For the individual, however, the following three kinds of limitation must be recognized: (1) The ends sought through the act of imagination, (2) skill in analytic observation and synthetic power, (3) the insuperable laws, or ultimate forms, of mental life. Thus the man of science or the inventor is obliged to limit his imagination, as the poet or writer of fiction is not; because the end which the former desires to reach by means of the imagination is so largely different. Nature, in fact, will not submit to *merely* poetic or fictitious combinations. The man untrained in the knowledge of the objects over which his imagination is to assume control is self-limited; he *cannot* work with creative freedom and efficiency among such unknown ob-

nd over all our imaginings — serene, undisturbed,
al, as it were — preside the laws of intellectual
ent. We cannot imagine God, angels, past con-
r future social developments, otherwise than in
ce with those laws. *Only the assumption that the*
r minds are indeed the forms of reality can justify
creative imagination in the extension of knowledge.

f Imagination in Mental Development. — The rela-
our picture-making faculty to the other forms of
evelopment — to intellect, feeling, and will — are
and important. There is no stimulus and guide
agination of the artist, or of the man of science,
so productive as the loving and analytic observa-
ature. Both artist and "scientist" are equally
o nature, although in different ways. But neither
cience can attain the highest stages of develop-
mere reproduction of the results of analysis.

elations of imagination to the development of hand, the pictorial art of Japan shows the superior excellence of the analytic observing eye, and, at the same time, the suggestive power which displays the higher type of imagination and invites the beholder to a similar constructive work.

In further illustration we may recall the fact that it is said of Balzac, he did not *copy* the two or three thousand types which play a rôle in his "human comedy"; he *lived them ideally*. And the author of "Masks or Faces?" has shown by the testimony of most of the great actors that the secret of their power is the ability so to place themselves, by imagination, inside all the characters they represent, as to live the actual life of emotion lived by those characters. Sympathetic feeling and "imaginative contagion" go hand in hand.

Kinds of Imagination. — As of memory, so of imagination, it should be said that there are as many kinds as there are principal forms of presentative experience to be pictorially represented. If, for example, the same foreign scene or distant event be described minutely before a score of persons, each will create of it a different mental picture. The world "over there" — whether it be across the ocean or across the river of death — is a different world for every traveller. The fact has already been referred to (p. 131 f.) that some persons are and some are not good visualizers, or image-makers in terms of sight. Others imagine everything in terms of words, thrown together into judgments, and scarcely at all as the vivid visualizer imagines the same things.

So, too, does every form of business or pursuit, every form indeed of mental life, have its somewhat peculiar kind of imagination. The picture-making of the man of affairs is practical; of the man of science, scientific; of the artist, æsthetical. A man cannot be conscientious and morally good, or cling to any form of religious faith, without possessing the appropriate development of imagination. A brief consideration of the more important kinds of imagination will, therefore, assist in a better understanding of this faculty.

-called Practical Imagination. — Nothing can be
n to great success without a considerable develop-
picture-making faculty. For, as Schiller says in
ıg of the Bell," it belongs to man —

"That in his mind he ever traces
What he constructs with his own hand."

oy who is devoid of imagination cannot learn even
uct a circle or an ellipse; much less can he over-
e inability, of which a student of solid geometry
nplained, "to get his nose in behind the figure"
ook. Men who plan great business enterprises,
al or military campaigns, or who institute explor-
ditions, must have large capacity of imagination.

ation in Science. — No other faculty is more im-
than imagination for the man of science. The
nstructive minds in science have been men of extra-
talent for a certain kind of imagination. The
re and advanced the science, the greater its demand

same image-making faculty. Of it Professor C. C. Everett has said that "whether it be true or false, it is as truly a creation of the mind as the fables of Æsop, where the monkey and the fox talk together. The fable may be more fanciful, the theory more imaginative."

Imagination in Art. — "Pictures and statues are the books of the people," said St. Augustine. The truth which art sets concretely before the mind, and the constructive imagination as the master faculty in art, — these are common-places of that more popular psychology which can best tell us many things that are beyond experimental demonstration. The history of music, for example, is chiefly a history of the development of constructive tone-picture-making. Enlarged scope was given this faculty when it was discovered that two or more *arias* can be sung at the same time, with agreeable effects, if only their successive tones stand in certain relations of interval. When modern harmony succeeded counterpoint, and a vastly increased number and power of musical instruments were placed at command of the artist, this kind of creative imagination became gloriously free. In the closely allied art of poetry, the whole mind expresses itself through the channels of constructive image-making faculty. "The imagination is in a special sense the poetic faculty." Yet unless imagination is clarified by thought, the highest creative work in poetry is impossible.

It is ideas as intuited in perception rather than as suggested by other ideas, or arrived at by thinking, which are caught by the artistic mind. In general, æsthetical imagination takes its point of starting from an intuition of the ideal, as present in concrete and individual experience.

Imagination in Ethics and Religion. — Right conduct invokes the activity of the imagination; and so does every satisfying religious ideal. The sphere of ethics begins only when the distinction is made between what is, in

, and what ought to be. *But that which ought to*
listinguished from what is now, or has been, must
ructed by image-making faculty. The very word
" in its genuine ethical meaning, stands for some
an ideal; and all ideals are constructions of imagi-
started in experience, moved by feeling, and guided
oning. It is as true of ethical as of æsthetical
tion that it is essentially an idealizing process.
lleged entities and accepted principles of religious
e especially dependent upon the constructive imag-
All intelligent use of the words for Deity (God,
nfinite," "The Absolute," etc.) and for the divine
es (eternity, omniscience, omnipotence, etc.) com-
the highest degree, the energies of both imagina-
d thought. No other exercise of the mind is at
ore severe and more stimulating than the attempt
re ideals corresponding to these words.

tion of Imagination. — The constructive picture-

CHAPTER XII

PRIMARY INFERENCE AND JUDGMENT

The development of what is more specifically called "the intellect" occupies the logician and the psychologist in two quite different ways. The former aims at establishing what he considers the universal and unchanging laws, or abstract forms, of all thought. Logic is, therefore, accustomed to start with its theory of conceptions, and then proceed to show how these logical elements may be joined together in judgments; and how the judgments may be derived from one another under the principles of all reasoning. Everywhere it aims at formal exactness. The psychologist is interested, the rather, in the evolution of mental life, as this evolution takes place in all its infinite variety and concrete fulness, in the individual man. He therefore pries about the roots of mental life, in its intellectual aspect, or phase, of evolution. From the more germinal forms of intellection, he proceeds, following the natural order, to the description and explanation of the chronologically later and more complex forms.

Our analysis of conscious states has already convinced us that they must all be considered as activities of the one subject of them all, the Mind. In each of them, as necessary indeed to constitute them mental "states" ready for objective treatment, we recognize the inherent activity of discriminating consciousness. The influence of attention, fixating and redistributing the varying amounts of psychic energy, as it were, is felt from the very first. That "immediate awareness" of similarities and differences, which is not a mere matter of having different sensations and but an intellectual recognition — a primary form tive action — has also already been considered. as been left for this and the following chapters the further and later development of intellect. es of this development, as the psychologist elects them, are not (1) conception, (2) judgment, and oning — all definitely logical. They are rather deed, we can speak of "stages" at all, where the o smooth and continuous — (1) a kind of intellec- t may be called "primary inference," a mental to a conscious synthesis called (2) judgment, and ise to (3) logical thinking supported by language, ormulating, or crystallizing, into a conceptual

back near to the point where the development of proper was broken off (see p. 48 f.), we resume by ing —

ctual "Assimilation" and "Differentiation." — A conscious separating of like and unlike factors from the total object, it is called "analysis." If it be regarded as having its result in bringing and consciously fusing together, some of these factors to the exclusion of others, and so constituting a new totality, it is called "synthesis." A higher kind of *intellectual* assimilation results, as these activities of discriminating consciousness become (1) more *voluntary* and directed toward recognized practical ends, (2) more *distinct* by repetition and by the emphasis of concentrated and interested attention, and thus (3) more *complete* because involving a larger number of the less obtrusive features.

A similar process of development provides, however, for higher and more complex forms of intellectual differentiation also. Nature furnishes many severe checks or cruel punishments for over-hasty assimilation. The boy *must* early learn to distinguish between the dog that bites not, and the dog which looks somewhat like his good-natured fellow, but which, nevertheless, will bite. Nice-tasting things seem, in some respects, like nasty-tasting things; it is important not to assimilate their common features without differentiating the signs of their taste-qualities. Here, again, a more voluntary, distinct, and complete form of active discrimination results in a more highly conscious and intelligent work of differentiation.

In general, then, *all fusion of sensations and ideas into more complex forms, and all association of ideas, when accompanied by the conscious fixation of interested attention upon the resemblances and differences of objects, issues in a combined analytic and synthetic process.*

Comparison as involving Primary Inference. — Such conscious discrimination of likenesses and unlikenesses as has just been described, with its more or less permanent assimilation of the like and its differentiation of the unlike, is a kind of comparison. It is comparison as

a sort of "leap to judgment" — a kind of crude
nely intellectual procedure which we have called
inference." Inference, in which judgment fol-
other judgment, with a clear consciousness of
und" connecting the two judgments, is called
It is a later product and requires much more
ent of mind. But a vague consciousness of
implied, beyond what is immediately given,
that early form of mental functioning already
. The mind is even now detected, as it were,
g from the seen to the still unseen, from the
as yet unfelt, from the present to the now past
still future. The stream of consciousness is,
arted on its way from the concrete individual
e abstract and universal. This movement dif-
the *mere* flow of ideas under the laws of asso-
Neither is it a mere relation of change, externally
bout, between the contiguous or more remotely

thesis. On the other hand, the higher forms of inference have to be described as based upon completed judgments; and logical judgments imply the formation of conceptions, or abstract ideas; while conceptions, in their turn, are the results of previous judging activity. We cannot, therefore, describe the development of intellect, as it actually occurs, by sticking fast to the logical meanings of these, or of any other similar terms.

The truth, as it will appear later on, is this: Conception, judgment, reasoning,—all the so-called logical processes,—are not to be described as actual forms of psychoses, statical conditions, or finished products, in the flowing stream of consciousness. For it is not in this way that they are experienced as actual functionings of the intellect. As the psychologist considers them, *the logical processes are rather successions of psychoses which derive their characteristics from the nature of their sequence, and from the laws followed in this sequence.* In conceiving, judging, reasoning, I do not remain still and motionless, as it were; there is mental movement in the very act of grasping together the different "*momenta*" of this mental movement. The psychologist must understand the nature and the significance of these forms of mental movement, in order to know what, psychologically considered, conception, judgment, and reasoning are.

The foregoing truth must be recognized in considering the nature of the most rudimentary form of the so-called intellectual faculties—the form which we have called "primary inference." (1) Negatively, it is *not* a mere fusion or succession of ideas; neither is it blind and nonpurposeful volition. But (2) positively, it may best be described as *a relating activity, directed toward the attainment of ends, with the added consciousness of relation.* And because this activity *is* a movement of conscious mind, which passes from object to object, carrying with itself (like a bee gathering honey) assimilating and differentiating ideas, and thus forming in its own interests new

r combinations, it is a kind of rudimentary
Attention focuses upon the new object, con-
aring with it impressions of past acts of assimi-
differentiation which will determine its attitude
s new object. A new sight strikes the infant's
sound falls upon its ear; or a strange feeling
r its skin. It is a challenge to attend, to come
dgment, to answer the question: What is that?
to judgment," this bringing the new under the
ory with the old, — a relating activity with the
ciousness of relation, — is the essential primary
the development of intellect. *This relating*
implied in "intellectual" assimilation and differ-
nd in all comparison, as these have already been
They all only lay emphasis on different aspects
relating activity.

re of primary intellection, and the factors and stages of
levelopment, have been differently described by different

we consciously assimilate two visual objects as like, by moving the point of regard from one to the other and, at the same time, carrying the fading image of each over, as it were, into the perception of the other, we pronounce them alike. This pronouncement is a judgment. If set into any form of reality by language or by other motor activity, it is a proposition and signifies a sort of finished experience. Considered as a purely mental affair — so far as we are able thus to consider it — judging is a conscious bringing of objects or ideas into relation with each other, by the focusing of attention upon their resemblances or differences, until the unifying and relating consciousness has become an established fact.

For example, I take two flowers **A** and **B** in my hands; or I approach the building **M** with the intention to decide upon the character of its architecture. I look first at **A** and then at **B**; I look frequently back and forth between the two. Finally, I affirm certain relations, and deny others, as existing between the two. But this final judgment is itself due to an indefinite number of other acts of judging through which I have been passing all the while during my attentive examination of **A** and **B**. Something similar is my experience while on the way to the conclusion that the architecture of the building **M** belongs to the class **X**.

The truly psychical activity of judging is doubtless very subtle, rapid, and difficult to distinguish by direct application of self-consciousness. This makes the psychological nature of judgment difficult to discover, and to describe accurately and completely. For judgment is essentially *objective*. Its very nature consists in bringing *objects* into relation, under fixed forms of relation; therefore it has little conscious regard to give to the mental processes involved in this act of bringing. It has even less regard for the significance of the forms under which

lishes its act of synthesis, — the forms of its
determined by, and as determining, the forms
n development. Enough has already been said,
to warrant certain preliminary statements which
ade more clear later on: —

dgment is a conscious mental synthesis, a unifying

is synthesis unites two successive portions of the
consciousness, with an added awareness of their
ctively related. It is mentally affirmed that the
g together, as in some sort one; but

ese objective relations into which the synthesis of
rings the successive portions of the stream of con-
may be understood either as the "*laws of intel-*
s the "*forms of things.*"

s involved in the Development of Judgment. — The
r intellect grows by maturing, correcting, and
g its judgments. The "intellectual man" is

Judgment as involving Developed Comparison. — We have already seen how comparison, considered as the bringing of objects together in consciousness, with the added consciousness of their resemblance or difference, is a primary activity of the intellectual life. But in developing our judgments we compare the objects of perception over and over again, and from more manifold and higher points of view.

For example, the flower **A** is blue and the flower **B** is yellow; as respects color, the unthinking child and the scientific botanist both refuse to unite **A** and **B**, under the idea of color-resemblance. **A**, when we turn to it from **B**, is seen *not* to be like **B**'s color-image; it is judged *not* to resemble **B**. This, however, is the limit of the child's comparison and the end of its judgment relating the two flowers. But the botanist compares the stamens, pistils, and leaves, etc., of **A** and **B**, judging yes, or no, in respect of the problem of likeness; and finally, he leaps over all the manifold differences of the two and pronounces a judgment of specific or generic likeness; or even of a more important connection. For, behold! he has discovered in **A** an hitherto unknown species of the genus **X**.

It appears, then, that *the development of judgment depends upon increasingly elaborate comparison; while comparison itself involves repeated acts of at least the more primary kind of judgment.*

Judgment as Identification. — No two objects, no two complex states of consciousness, are precisely alike. If they were precisely alike, they could not be discriminated as *two* and yet, at the same time, identical. But the intellectual mastery of the bewildering complexity of experience demands that objects which discriminating consciousness presents as *sufficiently similar* shall be in thought identified. What is to be taken as "*sufficiently* similar" depends upon the points of view from which the

f comparison sets out, and upon the ends which
to reach. The act of judging which disregards
portant differences of two or more objects, and,
pon their selected resemblances, unites the simi-
ugh it were the same, is an important function
eloping intellect.

recur, for illustration, to the examples already
Suppose that the flowers **A** and **B** appear, when
, similar in color; they are both red. In fact,
they are not *precisely* similar; for one is a darker,
her a lighter, red; or one is a yellowish, and the
luish, red. But as measured by the potency of
minating consciousness employed, and according
l designed to be served by the comparison, they
iently similar." Then the judgment, or mental
, which terminates the comparison, *identifies*
espect of their color-quality. **A** and **B** *are — both*
red. It is thus that similar sensations, or ideas,

hended as actually having something in common. This common thing is *the* quality **X**, or *the* relation **Y**,—the quality or relation *belonging to* them all. So far as *it* goes, *they* are "identical." This process of obliterating the particular mental existence of ideas, and of binding them together by judgments of comparison, gives to our individual experiences a secondary and symbolic character. *When the individuals, which are in sense-impression and idea merely similar, are judged to be really identical, the intellect has made unities out of them which are of a different order from those unities formed by the fusion and association of sensations and ideas.*

Judgment as resulting in Generalization.—Already the significance of "universals" in the development of intellect has begun to appear. The child who mentally affirms "**A** is a red flower, and **B** is a red flower, too; they are both red," does not, indeed, mean to judge a class-quality (the redness) as belonging to these individuals. Doubtless, this so-called "class" qualification is a fiction which logic appears to force into the interpretation of the consciousness of the child. And just as undoubtedly, the botanist who, in spite of difference in color, and of many other obvious differences, between **A** and **B**, identifies them as belonging to the same species or family, consciously means something more than the child means. But the germ of what the botanist's judgment means to him, and means to us, is in the judgment of the child. The child is "going to" generalize, is "going to" classify. This is because *its judging acts are going to bind the individual items of its experience into higher and higher unities.*

Generalization and classification are plainly the same mental act regarded from two points of view. When several objects are judged to be possessed of one or more attributes, or to stand in one or more relations, common to them all, the judgment is said to be a "generalization." Any of these objects, taken separately, or any new object, udged to be possessed of these same attributes, or to stand ame relations (whenever the judgment involves a conscious to other objects), is said to be *classed* with them. The set, of judgments binding together the individuals into a com- like-constituted things, is called "classification." But in rate form such development of judgment implies thought age, already far advanced.

s of Judgment retained by Naming. — It has just d that language, as storing and supporting our g, is implied in all the more elaborate processes of zation and classification. But some sort of a mbol seems necessary to "store" and to "support" less elaborate developments of judgment. Hav- ved at the synthesis of many individual experi- n the shape of something common to them all, ire some means for ready recall of the results of thesis. Many such results become recorded in the activities of body and mind, as we quickly and fully and identified the similar as, to our intents and purposes, the same; we have virtually recognized the universal in the particular. How now shall we record this experience so as to avail ourselves of its acquisition, to communicate about it with others of like intellect, and to acquire further knowledge on the basis already laid? Go to! let us give it — the thing, the quality, the relation — a Name.

But before we discuss the later developments of intellect as involving elaborate thought and the use of language, let us consider —

The Forms of Judgment. — There are as many forms of judgment as there are forms of the synthesis, or unifying *actus*, of consciousness in the process of judging. For the so-called "forms of judgment" are nothing but this — the different ways of one essentially the same intellectual activity in consciously relating the different items of experience. But since judgment is always, from the psychologist's point of view, a time-occupying process (judgment, psychologically considered, = judging), we may reaffirm this truth (see p. 264): *The synthesis of judgment is accomplished by an act which determines the flow of the stream of consciousness in such manner as to unite two successive portions of that stream, with the added consciousness that these particular two portions "objectively" (or "rightly") belong together.*

It is the task of logic and of the theory of knowledge to discuss the doctrine of the fundamental forms of all intellectual activity in judging. Psychology may, however, note the following three: (1) Synthesis under terms of *resemblance* or *difference*. Here certain points of likeness in the objects of perception or of imagination must serve as points of starting for the mental movement in the act of judging. We do not bring together in judgment — not even in order to pronounce a negation of their "belong-

ether" — things which appear utterly unlike. To
or example, that "an asymptote is not in the key
nor," would be to "play the fool" with intellect
han to use it. (2) Synthesis under terms of *time*
ce furnishes the forms which all judgments may
at result from comparing events as occurring in
on, or things as having quantity and number. But
a third form of judgment of which logic has taken
o account, and upon which psychology has hitherto
d far too little of its attention. It is that (3) syn-
f judgment which attributes *action* to an *agent*.
he very earliest dawn of truly intellectual life to
, the mind's chief interest centres in the behavior
ns and of things as affecting its own welfare in a
l way. It is what this particular thing, or that
ar person, *can do*, to hurt us or to help us, and
can do with each person or thing, that elicits and
the average man's intellectual energies.

"*Ça brûle.*" She had also been accustomed to play hide-and-seek with her mother, calling out "*Coucou.*" On seeing for the first time the setting sun disappear behind a hill, she exclaimed: "*A b'ûle coucou;*" — that is to say, "That-which-burns" (the agent) "is playing hide-and-seek" (acting as I do when I call out "*coucou*").

But we have already carried the development of intellect farther than it actually goes, in the case of normally constituted persons, without invoking the aid of language. In passing to the topics of the next chapter, however, it must be remembered that no sharp transition is indicated in the actual development of mental life.

[References to works on the psychology of the intellect, will be found at the end of the next chapter.]

CHAPTER XIII

THOUGHT AND LANGUAGE

e is seeking for a single term which will best sum-
and express the essential points in all the more
te processes of the human intellect, one finds such a
the word "Thought." Whenever we think, we are
g; —that is, we are passing from one judgment to
with more or less consciousness of the "reasons"
unds" which determine the order, in dependence,
uccessive judgments. We are, besides, both mak-
of *conceptions* already formed and also forming
nceptions. And, finally, the one essential and
ent thing about all thought is this: we are *judg-*

that objective judgment (sometimes called "perceptive judgment") is involved in all maturing of the perceptions of sense. It should now be noticed further, that *more or less elaborate processes of thinking often take place so rapidly as that the judgment in which these processes terminate appears in consciousness as a perception.* This accords with that view of the perceptive process which regards it as "solving a problem," so to speak, by passing from a basis of more or less doubtful sense-data to a genuinely intellectual conclusion.

To illustrate this important truth let us suppose three persons — one a stranger, one the owner of a house in a certain city district, and one the chief engineer of the fire department — to hear the same succession of sounds (a bell strikes five times with relatively short intervals, then pauses, then gives four more strokes with the same short interval). All three persons have heard a succession of sounds which are the same as respects intensity, timbre, apparent direction, etc. But how different are the *perceptions* of the three, if by this we understand the final attitude of mind toward a series of sensory modifications of consciousness! The stranger can simply affirm that he has perceived (experienced a succession of acoustic sensations, S^1. S^2. S^3. S^4. S^5. —— S^6. S^7. S^8. S^9., which he judged to be) a "bell-striking-nine-times"; has felt curious, has thought nothing more about it. But the house-owner has perceived *his*-fire-alarm-signal; has felt greatly excited and has seized his hat to run home; because he has judged: "My house is perhaps on fire." While the engineer has perceived "alarm-for-corner-of-A-and-B-streets"; has felt cool and collected; because he has at once judged, — "Not at all a dangerous district," and "plenty of water on hand."

Experiences similar to the foregoing may serve to remind us how those intellectual activities which spring

ıd often fuse with, what we call perception by the
re a kind of tangle of conceptions, judgments, and
easoning. The truth is that our actual experience
, or never, *purely* of the kind which the logicians
ıstomed to indicate by any one of these words.
experience of thinking, to be sure; but thinking,
ordinarily accomplished, includes all three of these
f intellectual life. The greatest, and the most
l one, of the three is — *Judgment, regarded as a*
s determining the character of the succession of our
s states in accordance with specific forms of relation.

leclared that to affirm "a carriage is passing the house" is
ıine judgment unless there is a question, "whether it is a
r a cart," etc. The truth in this somewhat perverse decla-
already been acknowledged in our study of perception. It
m more correct to say that there is a certain kind of infer-
ap to judgment, involved in every such affirmation. Note
nental attitude when we *pause* in the process of sense-per-
ıd take a bit of time to "make up our mind." This attitude

conception is a union of the reproductive function of consciousness with the thinking function — the essence of the latter being the act of judging.

A conception, as logic employs the word, may then be called an "intellectualized idea," or a process of ideation as it has been modified by being repeatedly made the subject of judgments about it. This is no longer the idea which best resembles its one original, because it is vivid, lifelike, and referable to that one original. It is the idea as adapted to be used in a great variety of judgments about things that are "sufficiently like" to be considered under the same general forms of relation. It is a conception; because it is not a *mere* mental image bound down, in its work of representation, to the memories or judgments pertaining to an individual experience. It is by thinking that this modification of our ideas is accomplished.

Nature of Logical Conception. — Logic speaks of the nature of the concept as though it were a statical affair — an entity, at least of a psychical character, that can be caught, examined, and found to have its nature determined by its "marks," its "intension" and "extension," its "potencies," etc. But psychology, from its point of view, can only regard this experience as a certain process in consciousness (an activity of conceiving rather than a finished product, called a concept).

Psychological investigation shows that by the "nature of the concept" is meant the way in which the schematized ideas are thought together under the different forms of that relating activity which is called judgment. Conception is a movement of thought, whose terms consist of a relatively few and highly schematized ideas.

The proof of the two italicized sentences given above comes from our experience in the actual process of conception. Every individual intellect has its own concepts; and the growth of every intellect both causes and depends upon a constant change in the character of the conceptual processes. Moreover, these general facts may be illustrated in the case of all individuals by experimenting to determine y what are the thought-processes with which each esponds to the stimulus of a class-name. For ex- let twenty persons be told to conceive of — say "a and to report the actual character of the stream of usness in passing through this process called con- . There will result twenty more or less different es actually given by the twenty persons. These ces, however, will all be resolvable into two kinds: ferences in the ideas (for example, a visual picture ng eyes and lashing tail, or an acoustic image of a a word-picture of "quadruped," "vertebrate mam- tc.); and (2) differences in the succession of judg- ronounced ("fierce," "strong," "dangerous," "lives ngle," "is carnivorous," etc.). In all cases alike ning of the class-name will be thought out in a f more or less highly schematized ideas united by al acts of judging. But the process of "thinking e meaning of a class-name *is* the process of logical fixed psychical entities answering to the word-names for different classes of objects is, then, a fiction due to the unreal and lifeless way in which logic and philosophy have dealt with the doctrine of the concept. To accept this doctrine results in one of the very worst of the psychologist's fallacies. In rejecting it, however, one must not go over to the other extreme of denying to the mind all power of genuine *thinking*, as distinguished from the mere having of associated similar or dissimilar concrete and lifelike representative images.

Few subjects have been more debated for centuries than the nature of the concept. Three views have been historically distinguished: these are the "realist," the "nominalist," and the "conceptualist." The first of these, in so far as it maintains some sort of a non-mental existence for the concept, has no place in psychology. The nominalist view, in denying, as did Berkeley, "that I can abstract from one another, or conceive separately, those qualities which it is impossible should exist so separated;" and in claiming that whenever the name of a class is used intelligently, the "mind must have before it some individual object either perceived or remembered;" misconceives both the nature of judgment and the changes produced in the ideation-processes by intellectual development. The conceptualist view, in its description of conceptions as though they were statical products of mind, or psychical entities, is equally faulty. It is the nature of the processes which go on in consciousness that needs to be observed. The characteristics of this nature are such as they have already been sufficiently described.

Thought as Logical Judgment. — Those mental processes which have just been described as constituting the nature of conception react, in turn, upon the nature of judgment. The reaction results in raising judgment to a second and higher stage, as it were. Because I have already judged, or know, a lion to be a "mammal" or a "carnivorous animal," I may unfold the conception of a lion by repeating these and other allied judgments. But suppose some *new* object is presented to the mind and the problem is proposed to thought: "*What is it?*" In answering such an

I must, as it were, apply a number of conceptions, framed, to the new object and thus try *to think it* em. If I succeed, I answer the problem with a higher kind of judgment: "*It*" (the thing about e question, What is it? was just raised) "*is a A*" (or, "It is not B").

e sake of clearness take an example: I perceive al which is *like* a tiger, but which is *not* a tiger, it is not "sufficiently" like; now, What is it? I t first to judge: "It is a tiger." But, stop! mal is not so extensively white on the under side elly as is the tiger; it is brownish yellow above tly striped along the sides, but it lacks the black the tiger on its bright orange-yellow ground. It mal; it is a quadruped; it belongs to the feline it is more like a tiger than it is like any other n that genus; but it is not sufficiently like to be ter the name of tiger. Let us sum up all the re-the "subject," "predicate," and "copula" of every judgment. By the term "subject" it understands that thing as perceived or conceived, from which the synthesis in judging starts. By the "predicate" it understands that idea which, following later in the stream of consciousness, is united by the synthesis of the judging act with the so-called subject. The "copula" is the term which calls attention to the fact of synthesis itself. As Bosanquet has said: "The copula, which in judgment is merely the reference that marks predication, and has no separate content, becomes, in the proposition, an isolated part of speech."

The psychological doctrine of judgment does not need to take account of the kinds of judgment which logic so carefully distinguishes. This is true even of the distinction between affirmative and negative judgments. For by "negation" is not meant the same mental process as the mere affirmation of difference. Negative *judgment* is, in its very nature, a positive unifying act of intellect; it is the settlement of a problem for thought by a positive affirmation; in it, too, we recognize the true synthetical nature of all judgment.

Thought as Reasoning Proper. — We come now to consider that secondary and higher development of inference which is, like the secondary and higher development of judgment, sometimes called "logical" reasoning. *This kind of reasoning may be defined as the conscious establishment of a recognized relation between logical judgments.* We note in it (1) the relating activity of intellect as effecting a synthesis of judgments which have previously not been thus related; and also (2) an added consciousness of the "reason" or "ground" on which this newly established synthesis reposes.

When such a form of intellectual activity is more carefully analyzed, the passage between the two judgments

somehow "concluded together" in a new judg-
seen to be effected "by means of" something
o both. This *means*, or mediating conception,
oken of as a "middle term." There are other
ever, of expressing the results of such an analy-
example, by emphasizing the meaning of the
ecause" and "therefore." In the first case,
myself as passing to the conclusion (or coming
that **S** is **P**, though the middle term **M**, which
the two judgments: "**M** is **P**," and "**S** is **M**."
cond case, I find myself judging (or thinking)
because I know that it is **M**, and also that this
Or, once more; — knowing, as I do, that **M** is **P**,
ening to think that **S** is **M**, *therefore* I pass to
ent: "**S** is **P**."

of Logical Reasoning. — Psychology needs only to
sis upon the following four considerations, in
et forth its doctrine of the nature of this higher

thing about men or about things. What he wants to know will determine his hunt after, and his selection of, the middle terms. *What kind of* a man is this I have just met? Good to do business with, or the opposite? Safe to trust as a friend, or the opposite? As has been well said by Professor James: "**P** overshadows the process from the start. We are seeking **P** or something like **P**." (4) *The intellect can understand the world only as a system of related beings which are ever — each one — doing something and having something done to them, — in more or less uniform and intelligible ways.* This is the persuasion which virtually gives confidence to our intellect in all its work of reasoning. But to examine it further does not belong to psychology.

The interesting and much debated question, Whether the lower animals *think*, can be answered only in the light of the foregoing distinctions. That they make many shrewd discriminations, cunningly adapt means to ends, learn by experience, and even intelligently modify their instinctive habits of action, there can be no reasonable doubt. But that they recognize the value and significance of middle terms, have the consciousness of one judgment as affording *reasons* for another, conceive the conclusions of ratiocinative processes as serving the ends of knowledge, and even vaguely sense the universal "relatedness" of things, it is difficult to believe, much easier to deny.

For example, shall we believe that the spider which Mr. Romanes describes as employing an ingenious and elaborate system of guy-ropes and haulings, in order to raise a fly, actually went through conscious processes similar to those of a mechanical engineer in solving a similar problem? This overtaxes our credulity. For if we go over to the point of view necessary for an affirmative answer, we raise at once the humblest of our brethren among the lower animals to a pinnacle of reason much higher than that on which we are ourselves standing. Indeed, in many such performances of the animals as that of the spider, with every increasing manifestation of intelligent skill, the likelihood of a consciousness of reasons diminishes. It is in being *conscious* of what he is about, and of what he ought to be about, in the *awareness* of the ends and reasons of his own conduct, and of the behavior of things, that the human infant early comes to surpass the most surprisingly intelligent of the lower animals.

s of Logical Reasoning. — The logical classification
cussion of the differing ways of thinking out con-
s do not greatly concern the psychology of reason-
Since the essential thing about the intellectual
es involved in them all is the connecting of one
nt with other judgment, with an added conscious-
the character of the connection (a consciousness of
" upon grounds" or "according to reasons"), the
t orders of relation under which the connection is
nay serve as a principle of division. These have
(p. 269 f.) been recognized as chiefly the following
(1) resemblance or difference; (2) space and time;
ion and agent.

Objects which are known to have one or more im-
characteristics in common with a third class of
may, "with reason," be concluded to be sufficiently
be thought together and given a common name.

tions of "force" and "law" are involved in this kind of reasoning. Conclusions involving these conceptions are the most frequent and important, the most popular and universal, as well as the most fundamental, in every form of science. From our past experience with things and with minds, as behaving in more or less uniform manner and always "doing something to one another," we argue our way to the future in time, to the distant and unseen in space, and even to the *scarcely* conceivable, by way of theory and hypothesis. Thus *every perceived change*, **P**, *is inferred to be due to the action of some agent* **S**; *for the reason that* **M**, *which is the known common sign of* **S**, *is connected with* **P**; *therefore*, **P** *is a case to be attributed to* **S**.

From the time of Aristotle downward repeated attempts have been made to state satisfactorily the nature of the *bond* existing between premises and conclusion, and so making the latter "valid." Aristotle's own law is the well-known *dictum de omni et nullo:* "Whatever is affirmed or denied of a class distributively, may be affirmed or denied of any part of that class." Kant stated the law thus: *Nota notae est nota rei ipsius.* Leibnitz, in a less satisfactory way, would have us accept the principle, *contentum contenti est contentum continentis.* All these forms of stating the principle,—of which Kant's is the best,—over emphasize conclusions coming under relations of resemblance and difference. Of all kinds of argument, however, that which treats this kind of relation chiefly, is most uncertain of its conclusions.

The neglect of the psychological truth that the relations of action and agent, and of different agents as "acting upon" each other, are most obtrusive and essential, has led nearly all treatises on logic into paths quite foreign to those in which walks and runs the living, energetic intellect of man. This intellect wants to classify indeed, and to be capable of a certain amount of accurate reckoning in terms of space and time. But not this supremely; or even chiefly. It wants rather to be able to *conclude* how the objects of experience—things, animals, and fellow-men—are going to behave as affecting their relations to itself and to one another. Men's daily acts of reasoning are chiefly "dynamical." In spite of its effort to be less anthropomorphic, and no longer to regard nature as a system of self-active but related individual agents, modern science moves more and more along the same line of argument.

iecessary to give in detail the psychology of the logical
between "enthymeme" and "syllogism," or "major
id "minor premise." The enthymeme has been well
an argument in the form in which it would naturally
ught or speech." This is because it puts the predicate
ion with the subject as a problem, which has been solved
ery of a "reason why." "Is **S** to be called **P**, or not?"
P, *because* it is **M**." In many cases of the actual opera-
itellect, the introduction of the concealed major premise
ificial and even a fictitious character to the whole pro-
iot a few cases such a major premise is found to be noth-
i that law of the intellect which governs all particular
al reasoning (see p. 281, no. (4)).

iology of *mathematical reasoning* is worthy of a word of
at this place. Much calculation, even of a seemingly
t, is not reasoning at all. Thus the tradesman of Japan
the amount of your bill, by means of his *Soroban*, with
y and accuracy. But his is no more a true *mental* arith-
re the movements of the fingers of a banjo-player. The
of real counting, however, involves a relatively high
of both imagination and intellect. And as Kant was

in reaching some particular new judgment in the form of a conclusion, by use of other judgment as its reason or ground. Among writers on logic Bosanquet has perhaps recognized this principle most clearly. He affirms that "the distinction . . . erroneously described as a distinction between Induction and Deduction is chiefly a distinction of *aspects*." In induction we start from observed likenesses or unlikenesses, of quality or of behavior, in individual cases. We solve our problem by concluding that the reason for these observed particulars is to be found in some general or universal relation among all "sufficiently similar" individuals. In deduction, on the other hand, we start with an assumed solution of the problem which is offered by the individual case. We then conclude the correctness or falsity of our assumption by relating the individual case to some principle regarded as already "sufficiently established."

Second: *There is always a certain amount of hypothesis, or unverified assumption, in both our inductive and our deductive arguments*, — especially as applied to the real objects of experience. The logician's *perfect* induction is not to be had. *Strictly universal and indubitable* principles, from which we may infer with *absolute* confidence a conclusion to *all* individual similar cases, do not belong to the possessions of the human mind. The word "sufficient," whether as applied to like qualities and causes or to the reasons for an inference, is a sort of ironical embodiment of the truth. What amount of likeness is "sufficient" to warrant classifying two beings, or two cases of agents in action, under the same class? What amount, or cogency, of reasoning is "sufficient" to compel, or to warrant, any given conclusion? That depends—always upon a variety of considerations, which neither psychology nor logic is wholly competent to handle. A practical sufficiency is worked out, with much mistake, disappointment, and yet

ressive approaches to satisfaction, but only in
the individual and of the race.

tle discussion has been indulged in by writers on logic
estion, How can knowledge grow by inference at all?
observed every case of an $\mathbf{M}$ ($\mathbf{m}, \mathbf{m}_1, \mathbf{m}_2, \ldots \mathbf{m}^x$), how
re that *absolutely all* $\mathbf{M}$ is $\mathbf{P}$? The answer to this, from
view of the analyst of human consciousness, is the frank
I never can be sure as a matter of *mere* logical argument.
n I sceptically examine my most cherished major premises
f so-called universal laws, I am apt to come across startling
This is true even of the law of gravitation; for it is not
alleged and extremely doubtful case of "levitation" under
influences, but the observed star 1830 Groombridge, for
ich seems to contradict this law. In all the workings and
evements of the human intellect we find what may prop-
l a certain amount of assumption, or "concealed hypothe-
, all conclusions are themselves only more or less highly
potheses, according as they stand related to the entire
experience, under the laws of intellectual life. No form
ience whatever can exhibit any system of laws which are

The Nature of Language. — The psychological answer to the inquiry, What is language? may be expressed in the following definition: *Language*, in the most general meaning of the word, *is any conscious modification of the motor organism which is adapted to serve as a common "sign" or "symbol" of conscious processes.* The fuller meaning of the definition requires notice of the following particulars: (1) Every conscious process — especially when it attains a certain intensity of psychic energy — tends to express itself in modifying the motor organism. The same general principle has been shown by the "dynamogenetic" value of ideas, and by the feeling of tension and strain connected with the repressed tendency of the motor centres of the brain to overflow and to send motor currents to the appropriate muscles. The theory which finds the physical basis of emotion in the "unorganized surplusage" of cerebral excitement; and, indeed, the entire view taken of the dependence of our experience, as "*of reality*," upon the activity of the muscles, points in the same direction. (2) The only conceivable means of communicating conscious processes is through some modification of the motor organism employed as a sign or symbol. (3) The fixing of such "signs" in definite ways proceeds in some measure parallel with the compound process of schematizing the ideas and of forming judgments which include in their terms a number of experiences. The growth of experience makes necessary a system of symbols. And, finally, (4) the acceptance of certain definite motor modifications as the symbols of certain conscious states, common to all minds, is largely a social affair. To a certain extent, the establishing of a system of motor symbols has its account in "natural" connections between some kinds of conscious states and somehow corresponding kinds of movements. Thus there are gestures and sounds which all men instinctively or impulsively employ, in order to express s states common to all; for example, perhaps, ıg, threatening with fist or foot, scowling, exclaand the imitative sounds generally.

y the very nature of human development is such guage must make its appeal chiefly to the eye and omething seen or heard. A few cases in real life s Laura Bridgeman's), and the fictitious case of el "God's Fool," show how man, even when dent upon tactual and muscular symbolism exclufar surpasses any of the lower animals in his for intellectual development. But human lans preëminently an affair of words; and "the primarily, is something spoken in order to be It accords, then, with both the physiological and hological conditions of the development of man's to find that in almost all our processes of thinkatch ourselves "talking to ourselves."

eem warranted in affirming that some recognized mental life on its sides of sensation, imagination, and intellection, are concerned in the origin and development of language. But it is in the realm of feeling, and of the practical effort to secure consciously selected ends, that some of its chief sources and stimuli are also found.

The answer to the question, Why the lower animals do not develop languages, is to be found in the considerations referred to above. In the more general meaning of the word, many species of them appear to have elaborate systems of "signs"—either felt, or seen, or heard, or perhaps smelled, or appealing to unknown forms of sensory effect—which express and arouse conscious processes common to all the members of the species. *Their* language corresponds most elaborately to *themselves;* as *man's* language corresponds to *himself.* The total cause of the differences in the forms which they use, as compared with human language, and in the meaning of those forms as expressed in conscious states, is no less than the entire difference between them and man,—both physiologically and psychologically considered.

The Word as a Name.—It is somewhat customary to say that the lower animals cannot devise and use names as man does, because they are incapable of "conception" properly so called. There is truth in this statement; although this truth is often incorrectly stated. To appreciate the facts let us recall what has been shown to be the nature of conceptual thinking as distinguished from the processes of ideation (see pp. 135 f. and 274 f.). Such thinking is not confined to a train of more or less vivid and concrete mental images bound together by the semi-mechanical laws of association. It is not *mere* ideation under the influence of those conditions which give to the particular ideas control over the succession of ideas. It is rather a series of judgments in which individuals are related as coming under common characteristic qualities and modes of behavior; and this is made possible, because we have agreed with ourselves and with one another to regard similar individuals as, for purposes of thought, the same, in respect of their qualities or of their relations.

ustrate this subject still further let us consider
ually takes place in human consciousness through
pt to "think out" the full meaning of a Name.
such case, especially wherever what is called ab-
inking is demanded, the most vivid and lifelike
not recognized as *fully* representing that for
e name stands. We *reserve* the right to change
ailed characteristics; and the more "content-full"
the more do we recognize their *unfitness* to stand
at the name means to us. The word "lion," for
must do service not simply for me, to name that
r beast in the cage yonder, or pictured on this
book, or conjured up as a lively memory of some
erience of mine. It must serve equally well for
ame another "sufficiently like" beast, picture, or
ance. And if we both try to imagine a lion, or
lk about lions together, the same word must set
our imagination, and must make our talk intelli-

The "same primitive union of sensation and idea" is preserved by the language of savages. Thus the Tasmanians call the quality of hardness, "like-a-stone," and speak of any tall thing as "having long-legs." (3) *The name is the support and vehicle of the conception because it operates to set agoing and to guide the processes of thinking which originally terminated in giving the name.* It is a challenge to every man who hears it, to think, and to think after the pattern of those who have come to use this name as a "movable type."

Romanes declares that animals cannot use sounds as movable types, because they are only capable of forming "recepts" (or rather highly abstract representative images). They cannot, however, form general notions or conceptions, in the stricter meaning, of the latter word. "That the verbal signs used by talking birds," says this writer, "are due to association and to association only, all the evidence I have met with goes to prove." In accordance with all that has thus far been said it is, psychologically, more correct to say that animals cannot use words as men do, because they cannot, to the same extent or in the same way, *think* as men do. The sage little boy of whom M. Perez tells, who remarked of certain insects: "Generally, but not always, those insects light on the leaves, etc.," far surpassed in conceptual thinking the most intelligent of the animals.

Language as the "Vehicle" of Thought. — The gist of what it is necessary to say on this subject has already been said. The relation of language to judgment needs no separate treatment from the psychologist's point of view. In all lengthy trains of reasoning, however, the partial or almost complete substitution of language, as a succession of symbols, for thought, as the succession of conscious ratiocinative processes, is of the highest influence. The development of thinking in relation to the evolution of language thus depends upon two things: (1) the rapid and correct substitution of the symbol for the actual intellectual process; and (2) the ability to think out in detail the meaning of the substituted symbol so as to justify the act of sub-

Thus it comes about that the accumulated
ge of man is so largely the ability to use words
tely to the actual facts and to the experience of
observing and intelligent minds. Growth in
is growth in judgment as to how to speak and to
— in case one wishes to speak or to act at all.

æsthetical and other uses of spoken or written
d the relations such uses sustain to the character
lopment of mental life, we can only make a bare
n at this point.

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nception and judgment, see Ward: art. Psychology in
t.; Carpenter: Mental Physiology, I, chap. 6, and II, chap.
es: The Principles of Psychology, II, chap. xxii; Taine:
gence; Lipps: Grundtatsachen d. Seelenlebens, chap. xx;
nann: Lehrbuch d. Psychologie, II, p. 241 f. Among the
of works on Logic, that of Bosanquet is, on this subject,
best: (see the entire First Volume); compare J. S. Mill:
ks ii and iii. On the relation of language to thought, see
Language and the Study of Language. On the develop-

CHAPTER XIV

SPACE, TIME, AND CAUSATION

There are some of our conceptions which undoubtedly stand in peculiar relations to the development of mental life. Among all such conceptions the most important are these three, — Space, Time, and Causation. To use popular language, which seems to be clear but which itself is most difficult to expound clearly, we speak as though all things existed "in space," all events took place "in time," and all changes must be explained as "due to the action" of causes. These and other similar conceptions are sometimes called "categories." So far as the work of the psychologist goes he may properly consider them from two points of view: — (1) As respects the actual conscious processes in which these conceptions arise, and in connection with which they develop; and (2) as respects the relation these conceptions sustain to the entire framework, so to speak, of our mental development. On this latter point, however, psychology can properly do little more than merely to note the relation. It must then turn over the problems it raises to philosophy in its two allied branches of epistemology and metaphysics.

Nature of a so-called "Category." — It is very easy to misconceive the nature of those conceptions to which we have just given the name categories. This is, indeed, because these conceptions are so peculiar. But their "peculiarity" does not consist so much in the way in which they arise and develop *as conceptions;* it consists rather in the way their origin and development *stand related* to the entire mental life.

eculiar psychological characteristics of the concep-
f space, time, and causation may be fairly well
up under the following three considerations:
arded as thought-products these conceptions are
of reaching a high degree of abstraction. To
e by the first one of the three: A series of judg-
ased upon a wide experience with extended objects
ption leads one to the bare thought of the "possi-
f extension in general." On the other hand, if
s to realize in the form of a concrete image what
lerstands by "space," one may select anything
r, from flower to star, from lightest gas to densest
om minutest speck to the hugest bulk conceiva-
ll alike are perceived, and must be imagined and
— however diverse their qualities — as "*in* space."
nnected with this peculiarity is the content-less
r of the categories. No variety of marks — to
gical term — needs to be grasped together in order

The older psychologies dealt largely with the so-called "categories," which by British and American authors were frequently called "intuitions." In this manner of doctrine they often became rather unwarrantably metaphysical. The so-called "new psychology" apparently does not consider the doctrine of the categories as requiring any thoughtful treatment whatever at its hands. In this manner of conduct it either ingenuously confesses its intention to confine itself to a portion of psychology, or else it rather unwarrantably neglects some of its own self-chosen business. For the human mind undoubtedly does, as a matter of fact, frame and cherish these conceptions as the most universal and necessary forms of all known existences. And no sincere and thorough student of psychology can consider anything pertaining to the business of the mind as foreign to himself.

The name "intuition" for such conceptions as space, time, and causation, is most inappropriate; and to class them together as belonging to a so-called faculty misleads us. To "intuit" is most properly to see presentatively, face to face, as it were; *envisagement* is the characteristic of intuitive mental activity. But even if we speak of ourselves as "having intuitions" of spaces, times, causes, instead of intuitively perceiving things as extended, successive, and acting upon each other, we cannot apply the same terms to our apprehension of the categories, Space, Time, and Causation. The conscious processes which correspond to these abstract conceptions are the furthest possible from an envisagement, or face-to-face acquaintance, such as we have with the objects of perception and of imagination.

A word of explanation will suffice to describe the peculiar nature of the categories as respects their relation to the entire mental life. This relation is such that they may be spoken of as the most general, content-less, and yet necessary forms of the mind's functioning; or, again, as the forms of all cognition — always actually, although, until brought out by reflection upon ourselves, unconsciously operative. Perhaps a sentence from the author's Philosophy of Knowledge will help us to grasp this thought: "By categories we mean simply those forms of the arising, the self-relating, and the development of our own ideas, which we believe to be shared by all men and belong to the unchanging constitution of the

stomary tests of a category, as given by the older psycholo-
(1) originality, (2) universality, (3) necessity. These
tics correspond with our actual experience, only if we
he words correctly. The conceptions of space, time, and
may be called "original" because an analysis of the expe-
hich the conceptions arise shows nothing lying back of the
itself which will serve to explain them, or from which we
them. This was really true of our doctrine of perception
s an "immediate awareness" of things external and ex-
was true of our doctrine of memory as presenting us with
appear as ideas present now in consciousness, but belong-
time. The categories are "universal" and "necessary,"
men do perceive, conceive, and think of things as spatially,
, and causally related; nay, they *must* so perceive, conceive,
of them, because "it is their nature" (the nature of the
do. They are forms of intellectual functioning.

s a so-called "Category." — The doctrine of space
ory, so far as the psychologist goes, is nothing
n the history of the development of the concep-

same activity of discrimination which brought this about, they can be in a measure separated. We can discriminate the thing as seen from the same thing as touched. Meantime, vaguer forms of space-perceptions by the senses of hearing and smell have become connected with our conception of the same thing. All this affords a basis for the general notion of extension as a quality of things, as distinguished from the sensuous intuition of this particular thing as extended to any of the particular senses. *Empty space*, for nose and ear, means all the space that lies between the object which emits the odor or the sound and our own bodies. Empty space for touch means all the space in which visual objects, that are not also solid so as to oppose our movements, lie extended. Empty space to sight means all that space which is limited by the opposition of things to our movement, through it, but which may be filled up with a perceived or imagined variety of visual extensions.

The process of discrimination which distinguishes areas that are filled to one or more senses, but empty to some other sense, needs only to be carried further in order to secure the conception of an "absolutely empty" space. If the room is quite empty to all touch-perceptions, and to all sight-perceptions so far as particular things in it are concerned, still I can measure its size (or extension) by moving my eyes, or by walking from side to side. By both forms of perception I encounter limits when I reach the opposite walls of the room; but between these walls neither sight nor touch perceives any thing. The room, then, "has no thing in it"—either visual thing or tangible thing; "it is *quite* empty," yet it has extension since I can measure it with both eye and moving body. It is filled with *mere* extension; it is occupied by *empty* space. This conception of "nothing but space as itself extended" cannot be imaged except in terms of either visual or

extension, "as of" a thing; but it can be thought
iere possibility of being filled with any kind of ex-
things.

ption of "Pure" Space-Relations. — It has already
own that the principal conceptions of the spatial
ies and spatial relations of things are based upon
ive experiences with sight and touch. These rela-
d properties for things visual can only be conceived
rms of sight; and the same thing is true of things
vn by touch. But considered — that is judged or
about — as *mere* properties and relations, the two
f experience are largely identical. They are not,
r, wholly so. And the most highly developed space-
ions of the blind have not in them the possibilities of
ion and freedom from the limits of sense which
to visual space-conceptions. It is looking into the
l "thinking about" the immensely distant stars
ives us our sensuous basis and up-lift to imagina-

entity, itself extended in three dimensions, for which the symbols stand as representative. But when the thinker gives meaning to his symbols he can only appeal to the same experience which makes up the "plain man's" consciousness of space.

These are not the final words about space. But when it has been shown that, as a conception, it is framed and developed by essentially the same mental activities as characterize all processes of conceptual thinking, and the peculiar relation has been noted in which it stands to the origin and growth of all our experience of things, all has been said that belongs to psychology to teach concerning the nature of Space.

Time as a so-called "Category."—On this subject nothing need be added to what has already been said, except to call attention to two truths: (1) The sensuous data on which the conception of time reposes differ from those on which reposes the conception of space. All *events*—hence all experiences—take place in time. But hearing, rather than touch or sight, is preëminently the "time-sense." (2) The range in the application of the conception of time is much greater than that of the conception of space. Phenomena of consciousness, whether of Self or of Thing, have time-properties and time-relations. It is necessary, then, to begin with indicating the nature of—

Elementary Time-Consciousness.—In order to understand the nature of that aspect of all conscious states in which the conception of time has its roots, it is necessary to observe the following truths of experience: (1) All the contents of consciousness, in order to be known as related in time, must be somewhat prolonged *processes* rather than instantaneous events. All conscious states actually take time to form themselves. For this reason we object to the favorite term, "the specious present," to indicate the unit of psychological time. It is just this present which *is* real actual "time-grasp" of consciousness. It is the matical present which is specious and unreal. The ›resent is never a non-enduring "now." (2) The ousness of time, whether of the endurance of a ›r of a succession of states, is itself a process. The ıension of time is itself a time-experience. (3) Con- states, as considered by themselves, all have an aspect ality, which we may call "endurance"; and when ıred they stand in a relation which we may call "suc- ı." (4) Attention, as stimulated by emotional paniments and effects is directed to this aspect, or y; and in connection with this focusing of atten- all the activities of the intellect are called out in ıg and developing the conception of time.

a word: *Every intellect constructs its own time-con- ıess; for the consciousness of time is itself a conscious s, but its peculiarity is, that it is an intellectual appre- n of all the contents of consciousness as processes* of the "now-going" or "just-gone," into the conception of "past time"; of the "not-yet-there" but coming, into the conception of "future time."

Development of the Conception of Time. — In the ordinary life of the child the succession of sense-perceptions, memories, and mental images accompanied by feelings of expectation, flows on at a tolerably uniform rate. And attention — to borrow a figure of speech from Dr. Ward — moves "like the foot of a snail" rather than "by hops from one definite spot to another." "Thus our perception of a period of time is not comparable to so many terms in a series of finite units, any more than it is to a series of infinitesimals."

Experiences occur, however, which concentrate attention on this time-quality of the different experiences, and so bring the consciousness of time to a "sharper point," as it were. These are, for the most part, such experiences as, on account of their painful or pleasurable character, excite a strong interest in their own duration, or in the repetition of their memory-image in its original connections, or in their anticipatory mental representation. *Such experiences emphasize the present, past, and future of the numerically different conscious states.* They constitute a challenge to conceive of these states, and to classify them, in another way than by their similarities and differences of quality or of locality. Thus our conceptions of present, past, and future, as qualifications of events, antedate our conception of time. The latter conception is, indeed, the result of a further process of generalization upon the basis of the earlier conceptions. We understand the three kinds of time before we conceive of Time in general.

We cannot speak of the conception of "empty" time with the same meaning as that which applies to this adjective in connection with our conceptions of space. All time is equally filled with the different varieties of our xperience. We cannot *empty* any of them, in of their time-qualification; for they are all alike ses in time. For that very reason, however, no how much alike or unlike as respects their contents , *as respects time-consciousness all the conscious states he intellect the same.* They are "assimilable" under conception of time. Furthermore, some of them ich more constant in the stream of consciousness re others; the time-rate of their change is relaslower (comp. p. 29 f.). They, therefore, serve as ground on which the more fleeting experiences recorded. For example, one may steadily observe e running for several minutes, while repeatedly the brief convulsive movements of the secondf a watch. Or one may think continuously of and friends, while the "fringes of consciousness" momently with the changing scenery of landscape hrough the window of the railway car. Thus the

The Conception of Number. — Counting is a highly intellectual and imaginative process, involving much more than a discriminating judgment as to the comparative quantity of certain objects of perception. It requires also the development of conceptions of space and of time. Each thing is discerned as separable in space from some other; and yet both things must be judged as coming under terms of some relation. The particular relation depends upon the point of view adopted, and the end chosen to keep in view. Thus the table is *one* table, with *three* parts (top, standard, and legs); or it is *twenty* different pieces of wood put together; or it is countless *millions* of molecules and atoms. When I count, I agree with myself that I will disregard the other unlikenesses of the things I am counting, and will consider the things counted as separate and yet unified by being judged under some idea of mine.

Conceptions of number all result from counting things and then judging them together under terms for each one of all the groups of individuals which we choose to constitute into that group — either for practical or for theoretical purposes. Here the repetition of some standard, some measuring idea, is always implied; whether it is so much space, or so many things, or so many events, upon which the intellectual activity of numbering falls. At the basis of the whole process lies the obscure yet fundamental work of discriminating consciousness. And the difference between the animal's discriminations of quantity and man's conceptions of number, is measured by the entire difference between the imaginations and intellects of the two kinds of sentient beings.

Causation as a so-called "Category." — Neither the ordinary nor the scientific conception of causation is a simple and unanalyzable affair. This conception cannot, therefore, be called a "category" in the same meaning of the hich applies to space and to time. If, for example, ounce any event (as the fall of a spark into a keg owder) to be "the cause" of another event (the n with its immediate accompaniments), we are zing the valid application to a particular instance *iety* of fundamental conceptions. Conceptions of Action, Relation, Time, Reason, or Ground, are all involved in such a judgment. Only a little less ly do we find present in every such judgment deas of Identity, Unity, and Force.

over, if the origin and development of the conception causation be traced, and the old-fashioned tests of ality," "universality," and "necessity," be applied, e found that these tests have now a different and ubtful meaning. It is difficult to formulate this d category in any such way that every man will be o recognize the formula as faithfully stating all the ithout any possible or conceivable exception, of his consciousness of self can be accounted for without assigning an important place to the active and conative elements of experience. It may easily be apparent, then, why the human mind feels warranted in framing the picture of a world of objects which are always "doing something to each other." *It is in the use of the muscles as dependent upon conation and in association with the feeling of effort and with various forms of pleasurable and painful feeling, that the conception of causation has its origin.*

Analysis shows that our primitive experience involves the following particulars: (1) The immediate awareness of ourselves as active, the fact of conative self-consciousness; (2) the immediate awareness of ourselves as suffering, as "undergoing" changes of affective consciousness, which we will not or which are not according to our will; (3) the closely accompanying perception of the changed relations of things, to us and to one another; (4) the association, in dependent connection, of these experienced and perceived changes, according to the forms of representative faculty; (5) the inchoate work of intellect in the reduction of this total experience to uniform modes of its occurrence, and the formation of the beginnings of a conception of "law" as applied to the changing relations of ourselves and of things.

Professor Preyer, in his book on "The Mind of the Child," II, p. 191 f., correctly finds the genesis of the conception of causation in "*the perception of a change produced by one's own activity*"; he speaks of "the most remarkable day, from a psycho-genetic point of view," in the life of the infant, as "the one in which he first experiences *the connection of a movement executed by himself with a sense-impression following upon it.*" In the case of his own child it was the tearing and crumpling of paper in which Preyer recognized the birth of this conception. He found the child from the tenth to the thirty-third month, doing and observing the effects of his doing, in all possible ways, with an amazing persistency. The infant pulls out and pushes in a drawer; he tears the covers of a book; he digs and scrapes to-

sand; he puts shells, stones, or buttons in rows; he pours
nd out of bottles and cups, etc. In a word, he is acting
same time observing the changes in himself and in things
w upon his actions.

pment of the Conception of Causation. — The an-
rphic way in which the child regards things as
ter the pattern of himself is too well known to
etailed illustration. The transition between him-
other human beings is suggested by all his expe-
the transition to the animals, with which he
or plays, is scarcely more difficult. "I hit the
he hit me back"; or, "I kicked the dog, and the
me," are typical instances of such experiences.
attribution of activity dependent upon relations,
wed by changes in relations, is not confined to
ings. And, indeed, how can it be? The related
of all things are interpreted and explained by us
analogy of our experience of ourselves with

regard" to each other. This conviction deepens and expands with the growth which the mastery of intellect attains over the different items of experience. It may be stated in this somewhat vague way: *All things are regarded as having the reasons for their behavior, in part, in their relations to other things. Only thus can that progressive unification of experience take place which is the law of the very life and growth of the intellect itself.*

[On Space and Time consult, besides the larger psychologies, Nichols: The Psychology of Time; Hodgson: Time and Space, chaps. ii–iv; Vierordt: Der Zeitsinn; and articles in Mind, vol. III, pp. 433 f.; and X, pp. 227, 377, and 512. On the psychology of Causation, see the author's Psychology, Descriptive and Explanatory, pp. 475 f., 500 f.; Philosophy of Mind, p. 218 f.; Philosophy of Knowledge, chaps. vii and x. Comp. Ward: Encyc. Brit., XX, p. 82 f.; Höffding: Psychology, V, 4.]

CHAPTER XV

KNOWLEDGE OF THINGS AND KNOWLEDGE OF SELF

is facts of *knowledge* in which the science of psy-
ogy, as well as every form of science, has its origin;
to facts of knowledge it must appeal to establish its
ms. The right to make this appeal in such manner as
lies a correspondence between the descriptive history
ind and the life of a real being which bears that name,
matter for philosophy to debate. In the same manner
volves upon philosophy to examine the ultimate war-
on which rests the popular assumption that the forms
ental representation and of conceptual thinking corre-

the word, except by using terms of knowledge. We can tell what is "known about" processes of knowledge only by assuming that those to whom the account comes will be able to verify it by facing themselves, as they themselves experience the same processes. Two most important considerations should be mentioned at once, however; for they are almost uniformly overlooked, not only in the popular analysis, but also in the analysis of many psychologists. First: *From the psychological point of view knowledge is a development.* Our mental life does not begin with genuine cognitive states of consciousness. It grows not only *in* knowledge, but also *into* knowledge — into more and more of what alone is entitled to be called genuine cognition. We may, therefore, speak of stages and degrees in the growth of knowledge.

Second: *The particular complex form of development which is called "knowledge" involves, in a living unity, all the activities of the mind.* Emphatically it must be affirmed: It is *not intellect* alone that knows, it is *we* who know. *Mere* thinking, if such an experience were at all possible, might go on to all eternity and no cognition of any sort result. Were not man a being of just such affective and conative, as well as intellective, faculties as actually belong to him, he would not be the knower that he is. But this point is so important as to demand further consideration.

Knowing as involving Feeling and Will.—That the growth of knowledge involves the development of all forms of so-called intellective faculty — of attention, discrimination, memory, imagination, judgment, and thought — is universally acknowledged. But the important part which feeling plays in the development of cognition has been relatively neglected by psychology. The affective modifications of consciousness, however, influence our cognitions in the following three important ways: (1) As

s of intellectual curiosity, of anticipatory pleasure
overy, etc., they serve the general purpose of stimu-
the more purely intellective functions of mind.
s feelings of relation, in various different forms,
company, conduct, and inhibit or reinforce all the
ctual activities,— the work of imagination, memory,
erception, judgment, and reasoning (comp. p. 95 f.).
) emotional factors and attitudes of the mind enter
nd determine the very character of the cognitive
es, as it were. *Intellect and feeling blend in all*
n; and the complex result — the very object of know-
— is determined by both.

xperience with illusions and hallucinations illustrates the
nt just made. The feeling of fatigue makes the lifted
to be perceived heavy; the feeling of disappointed expecta-
y make it appear light. The feeling of expectation may even
n object of perception to correspond to itself. Emotions of
or of shrinking make the object to be known as ugly or
It is not the unscientific man alone who puts his *presenti-*

emphasized and made clear in conceptual thinking, the acceptance or rejection of disturbing emotions, etc.,—it is scarcely necessary to discuss the matter over again. "How can a man learn to know himself?" asks Goethe; and his answer is: "By reflection never, only by action." The same thing is true of the knowledge of things. *It is only by willing, and thus experiencing the reactionary effects of willing, that we attain any knowledge either of Self or of Things.*

It is difficult to over-emphasize the importance of this view of the psychology of knowledge. The cognitive processes are never colorless and passive; they are warm with feeling and realized only as the result of voluntary activity. I cannot know myself as I am, without knowing myself as an emotional and voluntary knower. And it is only in and through our active experience with things in moulding them and in being subjected to their various forms of influencing us, that we attain a knowledge of nature. And, indeed, nature, as known to us, is a system of beings which are constantly in a condition of *interaction* with us and with one another.

The same truth can be argued from the point of view which considers the origin and nature of the conception of causation, as investigated in the last chapter. For things are not *known* unless they are experienced as causes. But, as we have already seen, such an experience can be gained only in a feeling-full and voluntary intercourse with things.

The Kinds of Knowledge.—In tracing the development of mental life we have already been made to recognize one important distinction in the kinds of knowledge. This distinction depends upon the relation in which the mental process of knowing stands to the object known. Hence the division into immediate cognition and mediate cognition, or "knowledge *of*" and "knowledge *about*." But it

so been made clear that this distinction is one of
s; although when the difference in degrees passes
l a certain not easily assignable limit, it becomes a
nce in kind. Thus, in any very elaborate act of
perception, "knowledge of" the particular thing
ved and "knowledge about" other similar things
certainly be blended together. The same is true
memory-knowledge of things absent or of distant
. Yet one would not hesitate to say that one's
edge of one's native town is a different kind of
edge from that which one has of Singapore, for
le, — in case one has read about the latter place,
s never visited it. All this, however, has been
ently explained in treating of perception, memory,
nceptual thinking.

re is a distinction in knowledges, as respects objects,
is of a quite different order from the foregoing.
s the distinction between knowledge *of* Things and

away, all manner of distinctions fade away; knowledge itself is lost.

We need, then, further to examine —

The Grounds on which this Distinction is based. — The distinction between the knowing Self and the things known cannot be made clearer than it is in itself; nor can the distinction be justified by giving grounds for it which lie outside of itself. This is true at least so far as its psychology is concerned. The psychologist can, however, note what factors or aspects of the conscious states are grasped together as belonging to the knowing Subject, the Self; and he can also note what other factors or aspects of the conscious states are grasped together as belonging to the objects known, the things that are regarded as external and extended in space. For this is what the process of "bi-partition" results in; — on the one side, a knower, and on the other side, the various things which he knows.

Let us now recur to the point of view from which the psychologist must regard all the phenomena of his science (comp. pp. 1 f. and 20 f.). They were all said to be phenomena of consciousness, — conscious states or processes, psychoses, forms of mental life, — *as such.* Therefore the psychological point of view was said to be *subjective par excellence.* But the study of the development of perception, and of the establishment of an actual "bi-partition" of all the objects of cognition, compels us to regard some of these conscious states as preëminently *objective.* They are given to us, to investigate, whenever we begin to approach their psychology, as the already accomplished cognitions of things.

Observation and reflection upon the dividing of all objects of knowledge into these two main classes lead us to recognize the following grounds on which the work of dividing is done: (1) It is chiefly the visual and tactual

ıpressions, with the memories, imaginings, and
s referring to them, which determine the com-
of our knowledge of things. But (2) the other
ıpressions — as of hearing, taste, and smell — be-
sociated with those of the "first rank" of objectiv-
hat we know of and about things through these
ons also. (3) All these sense-impressions have
relations to the changes of feeling and of the
consciousness from those sustained by that other
experiences which is organized into the knowledge
about the Self. (4) These latter — the "stuff"
which the cognition of Self is made — are not
ur sense-experiences at all, but our mental images,
s, feelings, and volitions. *They*, as activities
e perform, are the preferred aspects of experience
er themselves to be grasped together in the appre-
of Self, and to be subjected to reflection for the

ical shock accompanied by changes in visual and tactual perceptions which are calculated to result in knowledge of some external thing. Moreover, it cannot will away these sense-impressions of its own without changing its perceived relations to this external thing. But the arising and persistence of the painful feeling of being burned calls off attention to a phase of consciousness which is more truly *its own*. And this is calculated to stimulate a certain form of self-knowledge that has great practical importance. . . . Even in much of our adult life the distinction between Self and things is not consciously and sharply drawn. The same complex of sensations and feelings may at the present instant be either perceived as a hard-seated and sharp-backed chair; or as a localized discomfort in the Self of the person occupying the chair.

In general we may say: (1) *The element of feeling tends to preponderate as familiarity and habit blur the outlines of the intellectual apprehension of the object of knowledge.* And (2) *as the element of feeling increases, the distinction between the two classes of objects, things and self, is submerged, as it were.* Thus in many forms of adult but relatively unthinking life, a return to the vague and shifty consciousness of the child takes place. The skilful player feels his violin as a part of himself, for the time being; the singer or speaker does not regard his throat as apart from himself, until it seems "sore," "stiff," or otherwise an "objectified reluctant."

It is not necessary to develop further the psychological doctrine of the knowledge of things. What has been said in the chapter on perception, when brought into connection with what belongs to this chapter on the nature of cognition, will be quite sufficient. The whole subject requires, however, some more detailed consideration of the development of the knowledge of the Self.

Development of Self-Consciousness. — One of the earliest things noted (see p. 22 f.) about the elementary processes of the mind was this: Every conscious state, in order that it may come into existence in the stream of consciousness, involves a certain discriminating activity. Each state must somehow be separated off from the immediately contiguous portions of the stream and grasped together, in order to become *one* recognizable conscious state or mental process.

asons — so far as they lie in the contents of con-
ess — why some conscious states get regarded as
tes, and others get regarded as the *qualities* of
have already been briefly recorded. They have
een to consist chiefly in the affective and conative
which enter, in such different amounts and ways,
the conscious processes. But so far as these rea-
in the native ways of the behavior of active con-
ess, in the so-called "laws" which define the
l nature of mind, psychology can only accept them
nate and unanalyzable facts.

this point on, however, the development of self-
usness is not a bit more mysterious than is the
ment of objective consciousness, — or perception
"immediate awareness" of things. It is the same
intellect which is engaged in the acquisition of
inds of knowledge. I know myself better, as I
n my knowledge of things. I know things more

Because the psychologist cannot put himself into the place of the infant, without carrying over his own self-conscious development, he attributes the same kind of a developed self-consciousness to the psychoses of the infant. But it might as correctly be held that because the adult cannot see a certain object through the microscope without becoming "immediately aware" of it as an amœba or a diatom, therefore if the infant's eye were applied to the microscope, he too would have the same perceptive experience.

The opposite fallacy consists in minimizing and reducing to a *mere* difference in degrees the entire adult distinction between Self and other things. But in doing this the psychologist forgets that he is cutting from under himself as a scientific observer, as well as from under all science, the ground which comprises all possible points of standing. The validity of this same distinction he virtually assumes in all his investigations; and to it they all compel him to return. Everything he has to say about "subjective" and "objective," about "normal" and "abnormal," about "psychoses as dependent upon environment," and "conscious states as due to external stimuli" or as "dependent upon cerebral conditions," implies this same distinction. Whatever kind of metaphysics he may bring himself to espouse, as a scientific psychologist he stands firm only upon the basis of this assumed bi-partition of Self and things.

Stages of Self-Consciousness. — Although self-consciousness, like all other forms of mental development, falls under the principle of continuity and proceeds, as a rule, with a tolerably smooth and uniform flow, it is possible to mark off epochs or stages in its career. These stages are distinguished by the predominating character of the conception of the Self. In the actual life of mind, however, they continually mingle. And by no means all individuals attain to any degree of clearness or fixity in the higher forms of conception. That is to say: — The most metaphysical philosopher customarily conceives of himself in terms essentially the same as those to which the child is confined. But he can, and he often does, think out a conception of "*the Self*," for himself and for others, such as the child is incapable of framing; such, too, as the average adult has only in a confused and inchoate form.

ous numbers of Selves, or stages in the develop-
f the conception of Self, have been distinguished
erent psychologists. For our purposes it will be
nt to notice the following three: (1) The sentient
Self; (2) the thinking, willing, and cognizing
the Knower and Doer; and (3) the metaphysical
r the unitary and really existent being which is
ed as continuing all the way between its own
ered conscious states. Each of these three con-
s demands a brief consideration; and, first,—

Sentient, Bodily Self. — It has already been suggested
p. 314 f.) that the mixture of obscure bodily feel-
the sensations that are ill localized, confused, and
ve a strong tone of pleasure-pain mixed with them
s an important part in our work of dividing our-
off from external things. The peculiarity of such
s is this: in the work of "bi-partition" they may
gned in either one of the two main directions.

It has been well said that if the earliest form of the mental representation corresponding to the words, "I" "Ego," "Self," etc., could speak, it would say: "*What is here-and-now, that am I.*" But for the child, "What-*is*-here-and-now"—"that-which-I-*am*"—is what it can see, touch, and feel internally, of its own body. Ask it the question, "*Where* are *you?*" and it will point to the more sentient or accessible parts of its own body. Ask it the further question, "*What* are *you?*" or, "What do you mean when you say *I?*" and it can only repeat the significant gesture.

This most primitive form of the conception of Self early undergoes modifications that are connected with the general intellectual development. Such modifications may be traced in two directions: (1) the conception becomes more highly differentiated; and (2) the conception becomes subject to various accretions. The different portions and organs of the body, as they get separated off from each other, are more or less closely identified with their corresponding conscious states. Thus a child of five years, on being pressed to tell what she meant by the "I" that "loves papa," finally solved the puzzle to her satisfaction by saying: "Oh, now I know; it is my arms, because I hug him with them; and my lips, because I kiss him with them." Thus, too, we all speak of our selves as having a pain "*in* the head," or as seeing "*with* the eyes," and feeling "*with* the hand," etc.

At the same time, the childish and savage, as well as the popular adult conception of the Self is modified and enlarged by a variety of accretions. Among these perhaps the most important is the *name*. This led Goethe to say that "the name is not worn as a dress but grows on to us layer upon layer, like our skin." And Volkmann has remarked that certain savage tribes change the name of a sick child; and that calling an animal by the

me seems to encourage an obscure development
onsciousness. The clothes we wear are also an
nseparable part of our feeling and perception of
tient bodily Self. Lotze has remarked how our
and estimate of ourselves expands and contracts,
ergoes a variety of modifications, with the changes
in our clothing.

is sometimes called the "social Self" really falls,
measure, under the same stage in the develop-
the conception. Strictly speaking, there can be
existence, and no conception answering to such
ence, as a *social* Self. The social self is *my* self as
in a variety of relations to other selves. This
e all similar terms ("social consciousness," etc.),
tive; and unless understood as figurative, is a mis-
It is this sentient bodily being, rather than the
rely spiritual or more strictly metaphysical Self,
goes into" society, and which is conceived of in

Examples of such aberration in the work of so-called self-consciousness are frequent enough among hypnotic subjects; the insane asylums hold not a few afflicted in this way. Shakespeare illustrates the truth by the confusion which changes in the physical environment wrought upon the self-conception of his Christopher Sly. And Delbœuf tells the story of a poor cobbler of Liège, who having been captured by the monks while he lay in a drunken fit, shaved, made to suffer tonsure, clothed in monk's garb, and surrounded by "the brethren" and treated as one of their number, could only say: "Go to the foot of the bridge, and see if Gilles the cobbler is in his shop; if he is not, I am he; but if he is, may the devil get me if I know who I am."

It should be noticed, however, that in almost all such cases, although the conception of "who-and-what-I-am" is profoundly changed, all conception of Self is by no means lost. "Here am I," is still the formula with which the active, feeling, and willing mind announces its self-known existence. And if you ask it, "What are you?" the answer still is: "*What is here and now, that am I.*" All this requires us to recognize *an immense difference between a certain metamorphosis in the conception of Self, and a complete perversion or suppression of so-called natural self-consciousness.* The latter amounts to no less than the complete destruction of all recognizable being for the Self.

The Thinking, Willing, and Knowing Self. — Whatever may be the true scientific doctrine of the dependence upon the body of all conscious states, we are by no means always made aware in consciousness of this dependence. I may, indeed, be compelled to admit that when I think of myself, certain obscure bodily feelings about the region of the forehead or of the throat may be brought above the threshold of consciousness; or that I cannot will to perform any particular deed without creating a discernible feeling of tension or of strain in the muscles innervated by the act of will. But I can regard myself *merely as thinking or willing;* I can know myself *solely in the aspect of a knower.* This feat is accomplished by the same developed activity of memory, imagination, and thought, which makes it possible to regard the particular activities or common qualities of external things "by themselves," as it were.

Whenever I reflectively attend to any conscious state

wn, I am compelled to an act of recognitive
The very focusing of attention upon the state,
s, causes it to be regarded as one portion of a
consciousness that is somehow comparable with,
ble of being assimilated to, other portions of the
If, however, it is regarded as a self-felt and self-
ocess, — and it must be so regarded when I reflect
s a truly *mental* process, — the data are secured for
tion of a more spiritual conception of the Self. In
of the child, this conception is, so to speak, "split
its experience with the total bodily Self. For
if the child reflects upon the complex memory-
f its own experience in moving a heavy chair, or
g a heavy fall, part of this experience, even so
xcludes the perception of the object moved or
ainst, is more external and objective; part, how-
nore internal and subjective. It sees and feels
imbs as in contact with an object external to the

objective factors of such processes, however faint and unobtrusive and even impossible to detect they may be, this same "self-felt activity" is the constant as well as the prominent thing discovered by reflection.

It is, then, through the analytic and generalizing work of the mind upon its own growing experience that the conception of a spiritual Self is framed. This conception needs no other form of a mental process, no added faculty, in order to account for its own development. It should be noted, however, that the formation of this conception, like the formation of all conceptions, results from a series of judgments; and judgment is an accomplished synthesis, an achieved act of relating. This leads us to emphasize the following truths: (1) *It is as a self-active, thinking, and feeling being that I know myself as most clearly differenced from all external things,—including the visible and tangible parts of my own body;* and (2) *developed self-consciousness involves the judgment that, especially in certain of its processes, subject and object are related as a being is related to one of its many states.*

We may raise the question, why it is that the lower animals appear to have no conception of Self comparable to that of the lowest orders of men; and why we do not incline to consider them as actually being selves, after the pattern of human selfhood. The answer to this question must refer to the whole range of the differences between the mental life of man and that of the other animals. It is, then, an altogether unjustifiable exaggeration in Lotze to claim that a crushed worm, writhing in pain, can both make and attach value to the distinction between itself and the rest of the world, as the most intelligent angel, did it lack feeling, could not. For there is not necessarily the slightest germ of self-consciousness in mere "writhing in pain." And although human self-knowledge implies feeling, we cannot argue that no-intelligence could make this fundamental distinction unless it were under the stimulus of pleasure-pains. Besides, "making the distinction" and "attaching value to it" are two quite different things; it involves much more than a capacity for pleasure-pains, to be able to attach a peculiar *value* to the Self.

taphysical Conception of Self. — That men come to
n their minds, or spiritual selves, as real beings,
ve a unity of their own, and some sort of a per-
xistence in time, is no more mysterious than that
e to believe in the reality of things. It is, in-
en less mysterious. Regarded from the purely
gical point of view, and therefore considered
a conscious process, the fact is this: *In one and*
act the mind makes itself the object of its self-
and believes in the real being of that which it
s its own object.

ever, we ask for the details of this conception of
as a real being, we find the greatest variety in
individual cases. This variety is, indeed, great
answer to the separate experience of every indi-
ind that has framed any such conception. And
ld not the variety be thus great? For the con-

"knowledge." It shall be briefly touched upon as summarized in the term —

Belief in Reality. — That there is some sort of a "*trans-subjective* reference" in every finished process of knowledge, no man of so-called "common-sense" would think of denying. And even few psychologists have the hardihood to deny that a thorough analysis of knowledge inevitably comes upon this fact. These few can only put their denial into the form of an asseveration which is itself a confession of the fact, and so self-contradictory and absurd. The character of this trans-subjective reference, which is essential to the very character of every process of knowing, has been variously described. The points emphasized by all the descriptions correspond to certain factors in our common experience of knowledge. They cannot be altogether appropriately collected under any one term. But perhaps the phrase "Belief in Reality" is the best single term.

As Sully has said: "Psychology requires a single term to denote all varieties of assurance from mere conjecture up to reasoned certainty, and the word 'belief,' in English psychology at least, has come to be used in this sense." In this meaning of the word, all cognition involves and, in the last analysis, rests upon, belief. It is this element of certainty which, in some sort, submits itself to reasoning in order to become intelligent and self-conscious, and thus brings knowledge and reality into correlation with each other. Many writers — Hume, Bagehot, and James, for example — consider this belief as being more of the nature of a feeling.

In the study of the development of knowledge — both that of things and that of the Self — we are led to notice the following truths: (1) All intense and enduring experiences tend to call out and to strengthen that *conviction of the reality of the object* which characterizes all knowledge. As an object of opinion, or of mere image-making or thinking faculty, my psychosis has not as yet an existence affirmed for it "outside of" the mental process. But if my e with the object is intense and enduring, the that the existence of the object is independent perience, tends to frame itself in consciousness. conviction is justified and made rational, when it tself to a judgment that reposes on recognized I believe that particular thing to be real, that event to be actual, because its existence has been subject of a judging process which can recall why. In cases of so-called "immediate know- is "reason why" is because I have seen, felt, ., in an attentive and voluntary way. In cases or indirect knowledge, I find my "reason why" other person's testimony, or in some belief or which I have adopted, or in some law of nature which I know to be true. (3) This belief in pears in the development of mental life, at first, ny recognition of its own existence or of the end It is not the special possession of any indithis topic over to philosophy with the remark that *a scientific psychology seems to find a sort of metaphysical faith as an inseparable element in the existence and development of all human knowledge.* The origin and development of this faith have been described, so far as psychology can, in giving the analysis and descriptive history of both kinds of the one knowing process.

[For a further and more philosophical discussion of this subject, see especially the author's Philosophy of Knowledge and Philosophy of Mind. Comp. also James: The Principles of Psychology, II, xxi; Sully: Illusions; and The Human Mind, I, p. 483 f.; Taine: De L'intelligence, I, ii, chap. 1; Paulhan: L'Activité mentale, p. 297 f.; Lazarus: Das Leben d. Seele, ii, p. 41 f.]

CHAPTER XVI

EMOTIONS AND SENTIMENTS

velopment of the life of feeling proceeds upon
of a great variety of relations to our intellectual
ent. The bewildering complexity at which it
es, therefore, results largely from the modifica-
ch this intellectual development introduces into
er and more fundamental forms of feeling. The
istics imparted the physiological conditions of
ional aspect of the stream of consciousness
owever, be left out of account. With all these
al and bodily effects fully in view, we may

resonance." The physiological conditions of all feeling have already been seen (p. 91 f.) to provide for such a factor. The overflow or "surplusage" of that cerebral excitement which goes with all intense feeling is accompanied by important changes, not only in the centres of the brain, but in the various systems of the bodily organs — vasomotor, respiratory, muscular, digestive — to the remotest parts of the body. And the feeling of these changes blends with, and greatly modifies, the original feeling. In somewhat similar manner (3) the movements of feeling are accompanied by changes in the trains of the associated ideas and of the sequent thoughts; these changes are themselves, in turn, felt so as profoundly to modify the original affective conscious states. *Ideation and thinking*, as "appreciated" (see p. 95 f.) in the formation of the complex feelings, provide, then, a third class of variables. And, finally, (4) the *proportions* in which the simpler feelings enter into the more complex feelings are variable; the result of this variation of proportion is a "conflict," and a "blending," or a new "mixture," or a "prevalence" of certain factors over the others.

The following questions, then, may be asked concerning any very complex and developed form of feeling: In what proportions, and with what intensities, do the simpler feelings enter into the compound? And what are the factors of the compound emotion or sentiment, which are due either to the resulting bodily disturbance, or to the "upsetting" of the mind? Thus, for example, a special experience of feeling might be described as being very angry and slightly afraid, but not conscious at all of losing control over one's ideas, and suffering only a slight conscious change in the condition of the physical organism.

If such a "state" of mind as the foregoing be carefully analyzed, it will be found that two of the more fundamental natural emotions (anger and fear) enter into it, in varying proportions (as indicated ords "very" and "slightly"). But on account of an acquired self-control, or for some other reason, the effects provided for e second and third class of variables are not prominent in ness. No careful observer, however, would fail to find them to some extent, and so modifying the complex state of mind.

Primitive Kinds of Feeling. — There are forms of in which all men share; and which we have, there- reckon with in all our social intercourse with our Some of these belong to man in common with er animals. They have an important biological nce; they are safe-guards, encitements, and guides development of the individual and of the species. same time, there is among men the greatest range viduality in the "variables" just referred to; and primitive forms of feeling are capable of education refinement so as to make them a most important ndid part in the texture of the well-developed man. example, in two persons of different dispositions

Among the principal kinds of "native" feeling, on the basis of which the complex emotions and sentiments are formed, the following eight may be mentioned: Anger, Fear, Grief, Joy, Astonishment, Curiosity, Jealousy, Sympathy. These are all "human," not because they are not shared in by the lower animals, but rather because they belong to all men in such manner that their development is characteristic of the individual man,—in fact, largely determinative of the individual's character. They are all observable in the infant, at a very early stage of its development. The proportions, particular intensities, and the amounts of bodily and psychical disturbance, with which they manifest themselves, constitute largely what we are accustomed to call the "disposition" of every child. The way they get themselves woven into the habitual psychoses determines what we later call the man's character. They depend, with different degrees of closeness, upon the development of the life of ideation and thought. Thus, curiosity, jealousy, and sympathy require more "advanced ideas" than do anger, fear, joy, and grief.

It is neither necessary nor possible, in so brief a treatment of psychology, to enter upon the detailed description of these primitive kinds of human affective consciousness. In the vigorous infant, intense and painful sensations, especially when they are accompanied by impeding his free movements, naturally excite anger. Holding tightly the limb he wishes to move arouses in him the same characteristic reaction with which the young serpent or crocodile responds to the stick that is set in its way. Only the vaguest kind of perceptions are necessary to this emotion. So, too, do children show "natural fear"—that is, fear of objects of which they have had no previous experience to account for such fear. Sigismund tells of a little girl who showed fear of cats as early as the fourteenth week of life.

Curiosity, even as a semi-intellectual affair, belongs to very young children generally. Its roots seem to be in a sort of psychical restlessness, an impulsive reaching out for the pleasure of psychical activity. Definite intellectual curiosity is a later and more complex

But it is difficult to account for the development of the later thout recognizing this more primitive feeling of curiosity. sometimes called "natural" or "animal" sympathy can be treated as any one distinct form of feeling. Its earliest ce is connected with the principle of imitation (comp. p. 121), s the form of conforming one's own affective consciousness to arent in the social environment. Thus the babe that cries sees or hears its mother crying, really *feels* grief (of the sym- sort); and the school-boy who gets mad simply "because the is no less genuinely mad. It is in such "sympathetic" out- enticements of feeling that the foundations of social order ly laid. All through life —

> "Fellowship in woe doth woe assuage,
> As palmers' chat makes short their pilgrimage."

ction of Emotions and Sentiments. — There is no istinction between the two kinds into which the of this chapter divides the more complex forms ng. As has already been said (p. 328), the prin- affective development affirms that by modifying resonance" and disturbance of the ideas. But, as has already been indicated, any form of feeling may pass from sentiment to emotion, or the reverse. Thus, the sentimental queen of Prussia is said to have anticipated death with the emotion of joy; because she expected now to learn what Leibnitz had been unable to tell her. And a certain French chemist felt such an emotion of pleasure in one of his discoveries as to dance about his laboratory in the effort to give it vent.

Specific Characteristics of an Emotion. — When any form of feeling rises suddenly, or by a series of "summations," to a high pitch of intensity, the internal and external organs of the body feel the influence of an unusual excitement. Rather it would be more correct to say that these organs *are* thrown into an unusual state of excitement; and that *we feel* them thus excited. At the same time, as a normal result of the increased but less firmly associated excitement of the centres of the brain, the train of ideas and thoughts is disturbed; and we feel this disturbance. The stream of consciousness "runs troubled" with these ingredients due to excessive and not well coördinated external and cerebral excitement. Its current is emotional. We, considered as respects our experience of feeling, are in an emotional state. These three factors, then, enter into the creation of every emotion: (1) conscious psychical intensity, (2) felt "bodily resonance," (3) felt dissociation of the ideas and thoughts.

Of the first of these three factors it is necessary only to say that, in so far as the increased psychic energy which belongs to an emotional state of consciousness is not under the control of will, we appear to ourselves to be "suffering from the emotion" rather than actively engaged in bringing about the emotion. Our emotions *master us;* but when *we have* mastered them, they cease thereby to be so much "emotions."

ily Resonance" of all Emotions. — This chief charic of all markedly emotional experiences demands explanation. We can by no means accept a someidely current theory, which regards the emotion *ng but* "the feeling of" the modifications (tension, e, strain) which have already taken place in the external to the brain. Thus we should have to am very mad, because I sense the clenching of the e setting together of jaws, the "goose-pimples" on ı, the suppressed breathing, quickened circulation, ıd this "feeling of" the condition of these bodily is all there is of the emotion. This view is, howven physiologically considered a very inadequate lefensible hypothesis. It neglects the fundamen- that the primary correlate of all our life of feeling o be just this "surplusage" of unorganized cerebral ıent; and that the stream of consciousness is from t determined by the centrally originated changes muscles, and to the vascular, secretive, and respiratory organs. This sudden and intense discharge of nervous energy into these organs throws them into a condition of unwonted excitement. This excitement starts the sensory nerve-commotions from these organs to pour in upon the already much disturbed areas of the brain, and to modify and increase their disturbance. The total resulting disturbance may be spoken of as the "bodily resonance" or "organic reverberation" of the emotion. The "feeling of" it is what gives its more distinctly emotional character to the original feeling.

Psychologically considered, the emotions are then explained by noticing the explanation of the changes in consciousness which our feelings undergo as they rise to the emotional stage. The common thing about them all is the "appreciation" in consciousness — although it is a confused and unanalyzed thing, as becomes the very nature of an emotion — of this "bodily resonance." For *an essential part of the content of every emotion is that complex feeling which depends upon intense and widely diffused cerebral agitation, whether centrally initiated or due to the secondary changes in the organs external to the brain.*

The specific characteristics of the different emotions, so far as these depend upon the "bodily resonance" peculiar to each of them, vary considerably in details; and yet they have many features in common. That no considerable increase in the amount of cerebral excitement can take place without profoundly modifying the action of all the other organs of the body is a psycho-physical principle of the first rank. Among the organs whose action is most quickly and profoundly modified in this way are the following: (1) the rhythm and intensity of the heart-beat and the action of the whole vaso-motor apparatus; (2) the respiratory mechanism including epiglottis and muscles of the diaphragm; (3) the muscles of the face

'es which are so expressive of the various emotions;
) the muscles which support and control the limbs.
(1) the rapid and irregular or suspended beating
heart, the flushing and chilling of capillary circula-
nd the changes in the texture of the skin; hence
e quickened breathing or tendency to "catch the
," the feeling of suffocation, and the various modi-
ns of respiration, such as sobbing, gasping, etc.; as
s (3) the glowering of eyes, or the setting of the
the smiling or "haw-hawing," the open eye of joy,
ooping lid of grief; and, finally, (4) the defensive
ensive gestures and postures, or the flabby and
ling arms and legs. The effect of emotional excite-
n the voice, and on the vague movements or secre-
unctions of the viscera, is also noteworthy.

unnecessary to enter into the details of the different emotional
or to show how the varying characters of the "bodily reso-
produce the characteristic differences in the emotions them-

lar interconnected activity of the centres of the brain through the association-tracts is temporarily impaired or broken up. On the side of consciousness, this disorder may be considered as a relative or almost complete "dissociation of the ideas." Such a state of dissociation has to do (1) with the time-rate of the ideas, (2) with the character and order of their connection, and (3) with their relation to the subject's conative and discriminating consciousness.

In strongly emotional states of consciousness, there may be either an unregulated and increased rapidity in the succession of the ideas (a "hurly-burly" of our thoughts); or an almost complete suspension of the train of association. Thus extreme anger, grief, hatred, or fear, tend to lose all their ideational differences; consciousness tends to become a blur of blind feeling. All thoughts seem to fuse under the white heat of passion, somewhat as all the hues of the spectrum, under the most intense light, become whitish. It is also notable that the strangest and most unaccountable suggestions spring up in consciousness, when strong emotions are having their sway. Especially is the rational and "objective" connection of the ideas and judgments interrupted. That control of the thoughts and accurate discriminations of objects are difficult, or impossible, in states of emotional excitement, is a commonplace observation.

But considered as a form of feeling, the peculiarity of an emotion is that it is itself colored by those changes in the ideation- and thought- processes which it has itself produced. *The very feeling which produces the disturbance of ideation and thought is destined in turn to feel this disturbance.* The "feeling of" the changes already occurring in the associated ideas — the "feeling of" the *dissociation* — becomes an important factor in the character peculiar to all emotions.

ıbject should not be passed by without noticing the very erences which different persons exhibit in the way they r "carry," the emotions common to them all. Some feeling may be said, within not easily assignable limits, to heir increased intensity the more effective exercise of the l functions. Emotions of pride, love of approbation, etc., n this way. It has been reported of more than one great t, when angered by opposition or even insult, he had the f his powers. Other emotions, such as shame, fear, anxiety, ularly depress the intellectual powers. Yet so great is the " energy of some men that they successfully react upon y form of intense excitement, and bring it under control tter accomplishment of their chosen purposes. Such men ıoking with grief, and, *therefore*, speak or write so as the picture the reasons for this emotion in themselves and in t is the controlled display of emotion which excites corre- emotion in others.

eral, there seems to be no established principle to connect teristic strength of an individual's feelings with the bene- njurious effect upon his intellectual activities. For some, ons are a paralysis. For others, what Balzac makes Louis seem to exist among the different main kinds of human emotion. Thus the passage from one to another is made more probable and more easy, or more improbable and more difficult. From pity, grief, or a sort of fear, to love, for the same object is a frequent and comparatively smooth transition. And love itself may be broken up into a number of classes by "admixture" with either of these and with many other forms of feeling. The tendency of men to rebound from one emotion, especially when it is excessive, to its opposite, is also psychologically noteworthy.

Where the passage from one marked condition of emotional excitement to its opposite is sudden and abrupt, the later of the two emotions is enhanced by the contrast. This effect is doubtless partly a result of conscious memory, but it is also partly a result of the very contrast, physiologically and psychologically considered.

> "For if of joy, being altogether wanting,
> It doth remember me the more of sorrow;
> Or if of grief, being altogether had,
> It adds more sorrow to my want of joy."

Here, also, we may notice what Plato, in the Phædo, calls "an unaccustomed mixture of delight and sorrow"; and also the state of mind "which the most melancholy of all writers called the joy of grief."

Nature of the Sentiments. — It has already (p. 332) been said that those forms of complex feeling which are called "sentiments" are more distinctively "spiritual" than are the emotions. Indeed, of all our conscious states, considered feeling-wise, these are most thought of as belonging purely to the abstract and highly generalized conception of the Self. On the contrary, they have least of the marks of that "bodily resonance" which is so characteristic of emotional stages of feeling. Moreover, the objects which call forth our sentimental consciousness

y of them of a highly idealized character. Senti-
ttach themselves to our ideals, — of things, of per-
relations, etc., — to what we imagine and think
be rather than to what we know *actually is*.

uld be a mistake, however, to think that all in-
from bodily conditions is wanting to the senti-
f men; or that the "feeling of" these conditions
hing to do with the characteristic content of the
t kinds of sentiment. For, it has also already been
that the difference between the sentiments and the
s is largely relative; and that, if we increase
the intensity of any of our complex feelings, no
how refined intellectually and how much idealized
cts calling them forth may be, they tend to become
al in character.

specific characters of the different sentiments, as
pend partly upon the feeling of bodily conditions,

ject; we are reminded again that "substantially the same conscious state, so far as distinctions of affective quality are concerned, may be regarded either simply as a feeling, or as an emotion, or a passion, or a sentiment." Each of the three kinds of sentiments just distinguished, however, requires a brief separate treatment.

Intellectual Sentiments. — Of complex feeling, which usually has an unobtrusive "bodily resonance" and which is called out in connection with intellectual ideals, two kinds may be recognized: (1) There are certain sentiments which serve to give impulse and excitement to the intellectual processes; and (2) There are other sentiments which are rather the accompaniments and guides of the intellectual processes.

Among the first of these two classes is prominent that complex attitude of affection toward knowledge and truth which is sometimes called "desire" (of knowledge), or "love" (of truth), or "sentiment" (of the value of science or of truth). That lower form of animal restlessness, which develops in gratified curiosity, and grows more distinctively "intellectual" with all the growth of mind, has already been noticed. In its further and highest development this complex attitude takes several different directions. The imagination may construct a picture which seems to comprise all that is worth while in all the particular truths gained by our actual experience, and by all possible experience. This fiction of the imagination is then called, "*the* truth." Now, of course, there really is no one all-inclusive truth; and we have no reason in the least to suspect that any one logical judgment, or system of judgments, begins to comprise all manner of separate truths. But the mind falls in love with this intellectual ideal, so lofty and so fine is its own construction. If it falls violently in love with this its ideal, the mind may be said to have a "passion for truth."

v cases, this passion becomes so absorbing as really k havoc with mental development by suppression nction of equally noble and fine forms of senti- Thus Empedocles became "a living man no more: g but a devouring flame of thought, but a naked, y restless mind." Fortunately, however, this feel- en remains a milder sentiment appreciative of the f different truths, in accordance with their relation velfare of the souls of men.

onsidering the second class of intellectual senti- it is necessary to recur to a principle stated some go (see p. 95 f.): *All the processes of perception, , imagination, and thinking, have their peculiar nniments of feeling.* In not a few cases these sen- do important service in guiding aright the intel- processes themselves. In others this service is ious; but the feeling aspect of the conscious state uite as essential a part of the total state as does to bolster themselves up by repeated asseveration, with fist and foot, as well as organs of speech.

When any new and unexpected judgment is proposed for the mind's acceptance, it inevitably meets with a certain favorable or unfavorable attitude of feeling toward it, on the mind's part. No intellect ever works, as Mr. Huxley thought all intellects should work, — namely, as a "cold, logical engine." The way the proposition *feels its own* fitness with the established principles, beliefs, tendencies, and ruling sentiments of the mental life determines, in most instances, its acceptance or rejection. Is that white-sheeted form I see in my room on waking at night, a real ghost or an illusion due to the way the moonlight falls on the curtain? The truth of perception for me will depend upon whether I *believe* in ghosts, or not.

It should not be thought, however, that this influence of feeling has to do only with perceptions of, and judgments about, ghosts and similar things. In the words of one of the most distinguished scholars of the day: "If you wish to get the exact truth of fact from an expert, you must never ask but one expert." *For it is probably the feelings, far more and far oftener than strict logical conclusiveness, which settles for the time being what the truth must be held to be.* And, indeed, it is questionable whether men have any more ultimate test of truth than the sentiment or emotion of "conviction" which is itself rendered *firm* when any proposition makes them feel its fitness with the total character of their existing experience.

This so-called "feeling of fitness" is, indeed, itself exceedingly complex. It often includes the struggle or blending of surprise, expectation, feeling of similarity or of difference. The emotions and sentiments corresponding to the words anger, hatred, love, fear, admiration, and other terms of more distinctly æsthetical and ethical character, also take part in our total attitude of mind toward

h. The mental reaction of the "scientist," whom
Dalgairns describes as hearing with strong disfavor
urdly unscientific expressions of the hymns sung
d ship while he was trying to discover "the truth"
ome new kind of bug in his berth, was no less
al than was that of the most pious of the "hym-
s."

e of Æsthetical Sentiments. — The varied and pictu-
ctivity of the imagination in the construction of
kinds of ideals calls out for its objects a peculiar
sentiments. These ideals themselves are both
s and objective. The objects which call forth
al feeling are properly concrete and lifelike, so
ppeal to the constructive activity of imagination
some form of sense-presentation. But the ideal,
n the basis of this concrete and sensuous experi-
has been constructed, can no longer be regarded

and admire the creative and expressive spirit behind." But such "viewing" is impossible for an eye that is not "armed" with imagination.

But (2) the contemplative attitude of intellect before the object is the characteristic of this form of sentimental feeling. Thus we note that the æsthetical emotions of the artist toward his own work arise only when he can pause to regard it objectively, or can somehow separate himself from it. This attitude Schopenhauer has emphasized as "pure contemplation, sinking one's self in perception, losing one's self in the object, forgetting all individuality, etc."

Furthermore, (3) although the æsthetical sentiments are agreeable (or disagreeable) feelings, — that is, they have a more or less strong tone of pleasure-pain — they are not simply "feelings of" the agreeable (or the disagreeable). If that traveller in the Pyrenees, of whom M. Guyau tells, really had *æsthetical* sentiment when drinking cool, fresh milk there, he was right in speaking of himself as having "experienced a series of feelings which the word *agreeable* is insufficient to designate."

And, finally, (4) in describing the nature of the æsthetical sentiments we must never forget their dependence upon man's tendency to form ideals. This tendency may itself be very obscure and difficult to trace. May we not speak of it as a noble dissatisfaction on man's part with every thing actual? And is it not chiefly for lack of this tendency, and its accompanying evolution of the imagination, that the lower animals seem devoid of genuine æsthetical sentiments?

We know that certain students of biology have ascribed, in the interests of their theory of evolution, a very highly refined sentiment of beauty to some of the animals. But this is one of several cases where the interests of theory cause the investigator to overreach himself. To prove that birds and beetles take part in the process of "natural selection" by choosing their mates in accord with a genuine *æsthetical* sentiment, proves altogether too much. For it proves that

l beetles have an exquisite refinement of that highest form
which elevates them æsthetically far above the power of the
aturalist to appreciate or to sympathize with them. Appar-
the lower animals it is only some form of merely sensuous
eable feeling, which, so far as the influence of consciousness
perates in the selective process. But in man's case, on the
some genuinely æsthetical sentiment, or *admiring apprecia-*
object's value apart from its immediate relation to the individual,
vith all that is most sensuously agreeable.

e other hand, the laws of the economical and pleasurable
f the senses in contemplating the object must be regarded
ning all genuine æsthetical feeling. In not a few cases, how-
er considerations triumph over the lower and more purely
. From ethical and spiritual, as well as from certain more
ely æsthetical, points of view, that which is sensuously dis-
may come to be regarded with the highest kind of senti-
pprobation. Laocoön seems beautiful when we contemplate
l heroism and parental devotion which his otherwise horrible
picturesquely represents.

to move upwards and the head to be thrown back; the very bodily self seems to be expanding — but in vain, to take in the magnitude of the object. The attention is not fixed but wanders — away into the regions of space, or over vast stretches of time; or else it passes from one deed of great power to another, in the effort to experience the full effects of such a "summation" of representative energy. Meanwhile, imagination and thought are striving to outdo themselves in the framing of a picture of something worthy of the name sublime. In the appreciation of the exquisitely delicate or pretty, on the other hand, we feel the bodily and mental act of concentrated but not fatiguing attention, while the discriminating consciousness is giving to imagination a variety of agreeable details that are to enter into the products of its constructive activity. In this connection we may also remark upon the felt tendency to rhythmic and easily flowing movement which enters into our æsthetical consciousness of what we call "graceful."

A mere mention of the fact that there is a psychology of the ludicrous must suffice here. The physiological origin of laughter is found in the tendency to overflow, which belongs to all intense cerebral excitement. Thus the savage laughs when he thrusts his enemy through with a spear; and the child passes from crying to laughter, or blends both, under the influence of the same emotional excitement. The development of the feeling of the ludicrous takes place in early life, very largely under the influence of the principle of imitation. Even adults can scarcely refrain from laughing *with* others, although they do not know, or do not regard as ludicrous, that at which others are laughing. Laughter also occurs as an expression of the "feeling of playfulness." The sympathetic listener can scarcely avoid laughing at some of Beethoven's *scherzos*, which express so forcibly the "play feeling" (notably that — called by the master himself a *presto* — in the Seventh Symphony). With refinement of imagination the character of the sentiment for the ludicrous, and so the significance of laughter, changes greatly. It thus becomes more difficult to tell precisely what it is at which all men most intelligently do laugh.

s of Ethical Sentiments. — The distinctively moral
of feeling appear to be no more than the following
(1) the feeling of "oughtness" or of moral obliga-
nd its opposite); (2) the feeling of moral approba-
and its opposite), or appreciation of the value of
t; and (3) the feeling of merit (and its opposite).
st two of these three forms of ethical sentiment,
er, appear to be less clearly unanalyzable and
ved than the first.

ould take us too far into the special psychology and
he metaphysics of ethics to trace the origin and de-
ent of these forms of feeling, and to justify the
ent that they are the only, and yet the distinctively
, ethical sentiments. We must content ourselves
nsisting again upon the distinction between certain
of emotion and sentiment which become connected
noral judgments in a secondary way, and those

If this distinction were merely set into the child's environment, and did not awaken any unique response in feeling on his part, it could never become the basis for a truly ethical development. But the case is not so. Just as a peculiar form of agreeable feeling, which is something more than mere feeling of the agreeable, dawns in the consciousness of the child when it sees others admiring objects which they call "beautiful"; so does an equally unique, agreeable feeling, which is something more than a feeling for the agreeable, dawn within his consciousness when he finds others approving of his conduct as "good." At first the blow because he has bitten his mother, and the smarting burn because he has touched the glowing coal, have the same significance. But perception and thought distinguish differences between these two kinds of inhibition. An inner difference springs up, in the form of feeling with which they are received.

The forms of behavior in himself and others, to which the germinal feelings of "ought" and "ought not" attach themselves, depend at first almost wholly upon the environment of the child. He judges "right" that which those about him judge right, and "wrong" what those about him judge wrong. At first, then, the uniquely moral content of the predicates of such judgments, — of the ideas of right and wrong, — is defined, for the infant, in terms of the obscure feelings which are called forth in him. In other words, it is a matter of education and of development, *what* he shall judge right, and *what* wrong. But morals did not begin with his judgments; the history of the formation of moral judgments is as old as the history of the human race.

With the general development of the faculty of judgment — of the power to think for one's self on the basis of an enlarged experience of consequences and an expansion or fluctuation of ideals — the attachments of the ethical nent of obligation became changed. Hence, often- that peculiar conflict of sentiments which arises the individual feels "I ought not," according to the education of judgment, and yet knows "I ought," ise he now apprehends a reason for a valid change of nent. But from this point onward, it is not neces- to follow the development of ethical sentiment.

view just sketched seems to us to harmonize, so far as psy- y can, the opposite contentions of the intuitional and the evolu- y schools in ethics. In refusing to admit that ethical sentiments explained as a form of the feeling of the agreeable — that feeling belongs to the pleasure-pain group — the intuitionists the right, so far as psychology can say. Nor can we find any- in biology or so-called anthropology to displace them from this on. But that the particular judgments which called out these ents and which claim for themselves the appropriate use of the corresponding to the words right and wrong, are matters for cal and evolutionary study, there is just as little doubt.

eems also to us that the origin of the ideas of right and wrong

(1) As has already been indicated, many of the motor reactions called forth by the more primitive forms of emotion have a defensive or an offensive purpose to serve. The cerebral excitement of anger naturally overflows into the muscles, which clench the fists, and stiffen the limbs, and erect the body with head thrown back. But when Mr. Spencer argues that the distension of the nostrils in anger was caused by the mouth of "our ancestors" being filled with "a part of an antagonist's body," or that the frown was useful in keeping the sun out of the eyes while engaged in mortal combat, he shows his customary versatility rather than a corresponding regard for undoubted psycho-physical facts.

Moreover, (2) in connection with a wide extension of the pervasive tendency to *sympathetic* feeling, many of the emotions and sentiments operate for the defence and preservation of the species, and for increasing the social solidarity of the race. Indeed, certain of our higher sentiments are the forms of consciousness in which lie the sources of all the highest and choicest human developments. Among them the chief are the æsthetical, the ethical, and the religious.

For further extensions of this line of thinking we must resort to philosophy, whose rational faith Browning expresses in the question: —

> "Put pain from out the world, what room were left
> For thanks to God, for love to man?"

[See Ribot: The Psychology of the Emotions; Spencer: Principles of Psychology, II, § 503 f.; and Darwin: Expression of the Emotions. Compare also Stanley: Evolutionary Psychology of Feeling; Marshall: Pleasure, Pain, and Æsthetics; Maas: Versuch über d. Gefühle; and Leslie Stephen: Science of Ethics, chap. viii.]

CHAPTER XVII

WILL AND CHARACTER

s already been made abundantly evident that all
development, especially as a growth in the know-
f Self, is dependent upon the development of active
usness, with its added accompaniment of a con-
ess of activity. But the form of this development
hich all growth of mind so largely depends must
ow be briefly examined. The word "Will" is
rily chosen to express such psychoses as espe-
mphasize the side of developed active conscious-
In this way "willing" is made to enter into all

was then regarded as an original datum of man's mental life,—a sort of birthright belonging to every human stream of consciousness. But to exercise "free will"—in any meaning of the term which the ethical and social sciences can regard as psychologically satisfactory—is no man's birthright. It is the result of a complex development. It is, indeed, an achievement which different individuals make in widely different degrees. This development of the faculty called "Will" requires three things, each of which comes only as a maturing product of mental life, and to different individuals in very different degrees. These are (1) the formation of ideals that may be set before the mind to be realized by courses of conduct; (2) the intelligence of means which are to be employed in the effort to realize the ideals; and (3) the so-called power of choice, which is itself a matter of complex and varied development of the conative in connection with other elementary psychical processes.

The varied uses of the word "will" and the connections of the term with passionate discussions in ethics and religion (over "freedom,' "responsibility," "determination," and even the righteousness of the Divine Government) render it undesirable for the uses of the psychologist. Höffding has pertinently said: "As in Greek mythology Eros was made one of the oldest and at the same time one of the youngest of the gods, so in psychology the will may, according to the point of view, be represented as the most primitive, or as the most complex and derivative of mental products." But for the "most primitive" of those processes which are customarily described by this word we have already chosen the term "conation." And now for the very complex and varied mental processes which belong to the development of consciousness viewed on its active side, we have no better term left than this,—namely, the "Will." It is our design, however, to confine the following discussion as strictly as possible to the psychologist's standpoint.

It should scarcely be necessary in this connection, to repeat what has been said as to the "interpenetration" of all the other so-called faculties, during the whole course of their development, with the growing influence of will. Or rather, we may say: *it is the willing*

arded as definitely adopting ends, selecting means, checking or
appetencies, planning and controlling, or "succumbing" as
he trend and issue of the stream of consciousness, which is the
tal and the impressive thing about all human mental life.

re of a Volition. — The study of the "appetitive"
ns and processes of mind (see Chap. VIII), taken
nection with views subsequently established as
rowth of intellection (Chaps. XII and XIII), has
d the way for an understanding of the nature of a
. This higher form of conation differs from *mere*
y conation or primitive attention, by being con-
y determined according to some recognized content.
n is conation which knows what it wants. Such
n is involved in the intellectual processes of com-
, when these processes take place *with a view* to
dge of some object or to some immediate practical
Whenever the child *will* know whether **A** is or is

features. The particular modification of consciousness, or the complex conscious state, in which any volition consists, may differ from other volitions in the way in which the following five characteristics are combined: (1) The end toward which the particular volition is directed may be conceived with more or less distinctness. The amount of intellectual clearness modifies the character of the accompanying "deed of will." Inasmuch as the character of every volition depends upon its content, — upon *what* is willed, — as this *content* varies the volition itself varies in character. It is quite a different thing, for example, for the child to will to grasp an attractive bauble and for the man of science to will to enter upon a course of investigation into the correctness of the idea which has just flashed into his mind.

(2) Suppose that two or more *ends* which cannot both be willed present themselves in rapid succession before the mind. Then a "conflict of desires," with their accompanying tendencies to volition, must result. But in perhaps the larger number of cases only one end appears as the content of volition, and the volition itself follows without appearance of conflict. In this way a difference is originated between "unimotived" volitions and other volitions which follow, as solutions of cases of conflict, in the form of a more definite choice.

(3) The amount of *desire*, or of appetitive consciousness, which enters into different volitions varies enormously. This variation is dependent upon temperament, mood, circumstances, and upon the nature of the object in which the volition terminates. Some volitions are pale and nerveless; some are blood-red and swollen with the most intense passion.

(4) There are certain variations of volition which are characterized by the popular language, and which have to do with the way in which the will "goes off," so to speak.

ariation concerns the amount — the more or less —
t is called *deliberation.* The process of "delibera-
tself is a compound of intellection and inhibitory
n. "Hold on while I think" is its formula. But
y volition which terminates the deliberative process
according to the amount and character of the pro-
elf. The "deed of will" which follows prolonged
instaking deliberation is itself differently done from
"reckless" or "hasty" will.

Volitions also differ in an important way accord-
they stand differently related to the motor organ-
which they must rely for their *execution.* Here a
tion may be introduced between (*a*) volitions of
ion and (*b*) volitions of positive innervation. In
mer case (*a*) the "deed of will," during the process
beration, seems to resemble a "holding back" of
ndency to do something by immediate use of the
organism. The deliberative process terminates by

conclusive answer metaphysics must doubtless be held responsible. But the psychologist, as a faithful and unprejudiced student of conscious states just as he finds them, and by the method which cautiously adopts but does not cater or cringe to current conceptions of the students of physical science, *must reply:* Volitions certainly *appear* to determine the sequent psychoses including many of the changes in motor consciousness. This is, indeed, their characteristic peculiarity as studied in their place within the stream of consciousness. And, moreover, the psychologist may reply that, so far as we can ascertain by observation and experiment, volitions *do in fact* (that is, "actually") determine modifications in this so-called "stream."

In understanding such a position as that just taken, several modifications of the more obvious meaning of popular language must be introduced. It is customary to speak of "Will" as a sort of uniquely separable and solely responsible faculty, to which the blame or the praise of conduct must be awarded. It should be remembered that *in every developed volition the whole man acts; and that there is no such thing as a genuine "deed of will" which is not a complex resultant of all the so-called faculties.* I cannot *will* to conduct myself so as to reach any end unless I can frame an idea of that end; nor can I select and use means unless I know what the appropriate means are, or are likely to be; nor can I choose either end or means without the ability to frame and contrast the ideas of several ends and of their appropriate means.

Furthermore, there is no doubt that infants generally, and adults very frequently, will impulsively, and in such manner that the deed of will appears as only one psychosis in a stream which is throughout determined by the intensity and order of external excitements. Over against this class of experiences may be set those in which the volition seems to originate, internally, in the burning of desire or the white heat of passion. Such conscious states may be not unfitly described as *wilful desires* or *voluntary passions.* As Balzac has pertinently said: "Fanaticism, and all other sentiments, are living forces. These forces become in certain beings rivers of Will, which gather up and carry away everything."

These and similar experiences teach that, although the impulsive tional contents of consciousness appear to determine the the volitional, in turn, so interpenetrate and modify the and emotional as to have the appearance of determining hat I will what I desire, or am moved with passion to will, r than that I will what I shall desire and that I adopt my s the intelligent *motif* for a required "deed of will."

tary Thought and Movements. — That volitions do ne the character of the sequent conscious states is in the distinction between voluntary and involun- nking or movement. The *seemingly* forceful in- of what we consider as our own willing over the f thinking and the movements of the body cannot ed. In perception the object perceived, and the which it is perceived, often appear as something ned by our own volition. This appearance of ning the character of the mental train by "our olition is the characteristic of all active recollec-

or ideas, or thoughts, as such; but they are phenomena determinative of the character of all these other states,—in the one stream of consciousness.

In classifying the different bodily movements (p. 115 f.), some were spoken of as voluntary. These are characterized by three classes of peculiarities which do not belong in the same way to the so-called involuntary movements. Voluntary movements are (1) dependent upon volition, in the stricter meaning of this word as a "deed of will" directed to the realization of an end; they are (2) often suffused in a peculiar way with the "feeling of effort"; and they are (3) executed only with a special motor apparatus, or outfit of striated muscles connected by definite nerve-tracts with the higher areas of the brain. To exhibit the details of the last of these three characteristics belongs to physiology. Our attention has already been called at sufficient length to the second characteristic as indicative, physiologically considered, of the automatic energy of the central nervous mechanism, and, psychologically considered, of the feeling of being active and yet resisted in our activity. The first and central one of the three characteristics is emphasized by observing what are the actual modifications of consciousness which are experienced in all distinctly deliberate and voluntary movements of the body. *Between the desire to move and the idea of the movement desired, on the one hand, and the actually accomplished movement, on the other hand, something intervenes which is unique in psychical character, and which we express fitly by the words:* "**I will.**"

Nature of Choice.—The highest form of volition is that which men designate as a "choice." In the psychological treatment of this phenomenon of consciousness we are most of all compelled to be satisfied with description only. We can tell what appears to introspection as going on in consciousness; we can make a fairly complete picture of

e seem to ourselves to be doing. But here expla-
is at a *minimum.* A man's choices often appear to
come out of the mysterious depths of himself.
his appearance diminished by a careful considera-
the nature of those influences "under which," as
ularly said, he is conscious of choosing.

"moments," or "stages," may be recognized in the
borate and complete processes of choosing. They
following: (1) mental representation of two or
ds regarded as dependent upon conduct; (2) ex-
t of some desire, emotion, or sentiment, implying
g of the value of these ends; (3) more or less of
tion, or reflective weighing of these values, and
risks and consequences mentally connected with
oice; (4) decision, or the appropriation to Self of
these ends to the exclusion of the others — the
short of deliberation and the pronouncing of a

the experience in which the development of will arises than to observe the infant's early pauses of surprise and his hesitation before "judgment is rendered" and "action entered upon." More and more may this inhibitory suspense itself become a matter of volition. Hence the part which will itself plays in deliberation. It is the growth of experience, however, as a matter of memory and of cognition which enhances the value and enriches the content of the deliberative process. Men learn by experience that it will not do *not* to deliberate, *not* to think about consequences. They learn also what particular consequences to expect from the different courses of conduct whose attractiveness and value they are estimating in the process of deliberation.

The influence of deliberation, in itself considered, upon all the ideational and emotional factors which enter into the process of choosing is too obvious to need detailed consideration. Not infrequently a complete change takes place in our feelings and our ideas while we are deliberating. This is not due simply to the fact that passions have time to cool, desires to grow pale, and ideas to fade away or gather strength and clearness. It is also due to the other fact that *we are ourselves, in the very act of deliberating or estimating our own feelings and ideas, voluntarily determining the conditions of the subsequent choice.* For the distinctive thing about the deliberative process is, not so much its exercise of intelligence, as its voluntary character. It is will preliminary to choice.

Deliberation, since it involves the continuous and planful control of discriminating attention, and the conscious suspension of a deciding judgment until other judgments have been formed and the ideas have been subjected to some standard of value, is a notable manifestation of Will. It is distinctive of the mature human being to deliberate. Thus the development of this faculty differences the adult man — the full-grown Self — from the infant, the idiot, the savage, or the childish and immature adult.

e of a Decision. — It is in the fourth "moment" of
that the supreme manifestation of will appears.
indeed, that form of voluntary activity which is
lled *the* choice. Up to this point the complex
process consists of a more or less prolonged and
rapidly finished alternation of representative ideas
eir appropriate affective accompaniments. For ex-
A, B, and then C, appear in consciousness, and we
re or less strongly attracted or repelled by each.
easure, we constantly keep deciding which we will
to, as actually being somehow entitled (ethically
etically) to have most value for us. But as yet
not adopted either A, or B, or C, as the idea to be
reality by our conduct. A, or B, or C; which?
still the problem. At present it is scarcely C,
B, but most likely A, that will be our answer,
pted," for the solution of this problem. Still, who

psychologist, first of all, as a fact demanding recognition. As a scientific student of all mental phenomena he is bound to accept and describe this fact in its full significance, to explain it partially or wholly, if possible; and then, perhaps, to turn it over to ethics or to the philosophy of mind for further adjustment with our total human experience. Its faithful description emphasizes the following particulars: (1) After making a decision, as well as during the process of deliberation which leads up to the decision, we know that we are "influenced" by motives. That is to say, we know that some ideas "attract" and some "repel" us, and so modify our affective consciousness; and that ideals have different degrees and orders of value in our imagination and judgment. But even in all this we are conscious of "*willing* our own way," in a measure, toward the final decision. (2) In making *any* decision, if it is a real *decision*, and in reflecting upon it after it is made, we have the rational conviction that *it*, in some peculiar and unique sense, *is our very own.* We were more or less strongly influenced, to be sure; and we now believe that the decision was wise or foolish, morally good or bad, as the case may seem to be. But, in any and every case, we did it. If any of our conscious states are ours, then a decision is *a fortiori* ours; if we have any right to believe that we ever do anything, then we ourselves do make (and do not have made for us) our own decisions. (3) When, however, we come to explain to others, or to ourselves, how a decision can really originate in this way, most of our attempted explanation is either a subversion or a reiteration of the fact of experience. I decided; — in the view of considerations A, B, C, etc., to be sure, — but still it was I who decided. I know what it is to act impulsively, to do things, even those that *seem* voluntary, without making any real decision. I do many things this way; but in this case, it

t so. The reasons for my decision were these; and
se reasons, *I* so decided.

näive declarations of the facts of consciousness
, at present, made any more explicable by the re-
s of a scientific psychology. We doubt whether
ill ever be explained; whether they will not always
be accepted as expressing an ultimate datum of
At any rate we are warranted in saying that, *to the*
science of psychology there is nothing known that
any less unique, mysterious, and impressive, the as-
n of an inexplicable spontaneity of conscious mind
ing, after deliberation, a decision.

is the place to protest against assumptions or alleged proofs
iscredit or weaken the character and significance of a con-
d deliberate choice. Even so fair-minded a writer as Höffding
e gone beyond the limits of scientific hypothesis when he
: "Psychology, like any other science, must be deterministic;

The Formation of Plans. — The more expansive and wide-reaching, though less intense and concentrated, exercise of the developed will is seen in the formation and execution of plans. All volitions and choices are, indeed, purposeful; they contemplate some plan of action. If, for example, I choose to draw the straight line **X** between *A* and *B*, rather than the curved line **Y** between *C* and *D*, or choose to draw a circle rather than a triangle, I am adopting one plan of conduct in preference to another. But deliberate choices, or "deeds of will" that have been "thought out," constitute a sort of hierarchy in the control of conduct. As entering into such comprehensive choices we notice especially the following four variables: (1) Both the end proposed, and the means necessary to the realization of the plan, may be more or less comprehensive in themselves. But *comprehensiveness*, in general, is characteristic of planning as distinguished from choosing in an isolated fashion, as it were. (2) Steadiness or firmness of will — what Sully has expressively referred to as "the very backbone of what we call will" — varies in different plans, and in all the plans of different individuals. But *steadiness* of will is more generally characteristic of plans than of single volitions or choices. (3) The degree of the subsequent modification of the Self which follows the formation of different plans varies greatly. Some terminate quickly, and with unimportant influences over our other mental life, and our habits of action. But others are transforming. And, in general, *control of conduct* belongs to those choices which constitute the formation of a plan. (4) The plans of any man do not all indicate to the same extent the more fundamental emotions, the profounder convictions, the more influential ideas and thoughts, of the man. But the *character* of every man is indicated in the most summary way by the plans he forms and by the way he pursues them.

then, in the formation and execution of plans that
ıificance of the development of what is called "the
will" becomes most obvious and most important.
s in this shape that the supremacy of conduct, and
l purpose of mental development for the individual,
ıarly appear. These two truths, then, belong espe-
o the psychology of the will as engaged in the
ɔn and execution of plans: (1) *The intimate con-*
between developed conation and motor consciousness,
choices, and the tensions and movements of the mus-
ganism as necessary to the realization of the choices,
ıhat we call "conduct" (as distinguished from mere
possible. All the psychical development thus cul-
and expresses itself in planful, voluntary action.
do according to a chosen plan, how I manage
in a large and comprehensive and intelligent way,
is, especially, what I have come to be.

plex. It consists in intellectual excellences; in his endowment with a number of vague and yet influential, emotional and sentimental tendencies; and even in the superiority of his bodily organism, with its apparatus for articulate language, its deftness of hand, its upright posture, and large-sized controlling brain. But it is also, and preeminently, a matter of the grasp and steadiness of will. In larger measure far than any of the other animals, man can lay hold of, and shape and mould his conduct, his very *Self*, according to an ideally valuable plan. Thus the Paracelsus of Browning surpasses the ape, the child, and the savage; because he can say: —

> "I have subdued my life to the one purpose
> Whereto I ordained it;"

or, again: —

> "I have made my life consist of one idea."

The Consciousness of Freedom. — The offices of psychology in the settlement of disputed questions in metaphysics and theology have been nowhere more abused than in strife over the so-called "freedom of the will." We have already seen that psychology does not justify this term, if by "the will" we are to understand an isolated faculty that is somehow naturally endowed with a quality called that of "being free." But the psychologist, as a faithful student of the phenomena of consciousness, notes how one of the parties to this strife is accustomed to deny or explain away the facts of consciousness; and how the other party is tempted to exaggerate and overstrain the testimony which consciousness yields in the form of certain undoubted and important facts.

The conscious processes on which the conviction "I am free" are founded, or in which this conviction is involved, have already been stated. They are no other than the processes of choice; and especially, in an intensive way, the nature of decision, and, in an extensive way, the formation and execution of plans. To sum them up, they are all expressed, in a positive way, by the assertion: *I* will; the decision is made *by me*. I consciously make

y own mind. Expressed in a negative way, how-
this conviction appears equivalent to a denial that
fluence, even that of my own desires and emotions,
ls me. The choice is a deed of my will; and in
g it, I am not forced, or compelled, or consciously
nined (in any other than the way of rational influ-
to make it as I do.

claim that the above-mentioned facts constitute an
liate and indubitable testimony to the freedom of
lf from law, or from all causal connection with the
f the world, or to the independence of mind on brain,
te to overstate the characteristic impression of the
But, on the other hand, this sort of an experience
t be resolved into the *bare* consciousness of acting
influence, rather than by compulsion; or into a
ousness of acting, with an added consciousness of
ignorant of all the reasons for the particular form of

resolutions of will, backed up by mighty passions or worthy sentiments, which cling to the pursuit of consciously accepted ideals. Luther's "God help me; I cannot otherwise" is a very different thing, psychologically considered, from the child's whimpering "I couldn't help it," or the kleptomaniac's plea of "Guilty; but compelled to do as I did."

The Fact of Imputability. — The attribution of the "deed of will" to the Self, especially in the forms of decision and planning, follows from the consciousness of "being free" in willing. The conception of "imputability" and of resulting "responsibility" follows from the joint influence of the doer's ethical sentiment and his apprehension of the prevalent social judgment. Who did this thing? is a question which both the individual and society are always asking. If I remember that I willed it, I say in the fuller meaning of the words: I did it. If it was done by me as a matter of my choice, I am required by society, as well as by my own consciousness, to assume responsibility for it.

It is important, however, to notice that the distinctions which the social development of man makes and enforces are by no means very nice here. As to imputability, there is little hesitation or doubt, as soon as the question, To what Self can this doing be ascribed? has been answered. But different communities and eras of civilization, as well as different individual theologians and moralists, vary enormously in their estimates as to what are the nature, the limits, and the grounds of responsibility.

At this point descriptive psychology is compelled to hand over the theory of will, its freedom and development, to the researches of comparative ethics and to the reflections of the philosopher. Yet in doing this it seems to have brought us to the place where we have to acknowledge that, *not something external to consciousness, but something manifesting itself in consciousness, contains the secret of man's mental life and mental development.*

Formation of Character. — All that has been said in
hapter has been introductory to a most important
ption. This conception is best expressed by the
"Character," in the narrower and more carefully
d meaning of the word. In such a meaning of the
we ideally separate off, from the obvious character-
of the stream of consciousness, something which
to be more permanent and to lie lower down. Of
more permanent and profound characteristics of this
n, we further constitute two divisions. To the first
on belongs what we vaguely call our "nature," our
osition," or "temperament"; to the second we
e our *self-formed habits of will.* The habitual
s of my voluntary reactions I call my "character"
narrower meaning of the word.

o remarks at once suggest themselves: (1) We can-
n fact, carry out into details the separation between

savage peoples notions of the responsibility for conduct are little governed by such a distinction. The same thing is true of the distinction between responsibility and imputability. Among such peoples those individuals who are regarded as inspired, or possessed, or otherwise controlled by some indwelling agent, may still be held responsible for deeds not clearly or fully imputed to them. The feeling of responsibility for the sins of the nation or tribe, which is so strong in certain communities, affords another interesting class of phenomena bearing on this problem. In the doctrine of metempsychosis, the praise and blame which our modern ethics consider merited only according to character may be awarded according to the nature of the individual. Certain systems of theology, as is well known, have founded themselves on a psychology which refuses to distinguish between nature and character, or between the most vague form of imputability and the strictest form of responsibility.

The Education of Will. — Since the formation of character according to right ideas is the supreme end of all education, the development of will is essential to successful education. Three things are particularly to be noted as bearing on this development: (1) The desirability of getting the habits of bodily movement formed as early as possible, in accordance with considerations of economy, ease, pleasure, and of a higher æsthetical and ethical order. Thus the conscious control of life is facilitated by the services of a good automaton.

(2) The formation of correct habits of attention is also one important part of the development of the will. In its higher applications this means the securing of conscious selection and fixation for the ideals of conduct; and the intelligent discrimination and use of the means necessary for their realization.

(3) Then follows the construction of a system of principles of conduct, which must not rule with rods of iron over a rigid and unbending subject of volition; but which must secure a blending of that uniformity which is necessary to give unity, with that capacity for constant read-

nt which is necessary to all genuine and successful
pment of the higher mental life.

ddition to works already referred to, consult on the conscious-
self-activity and the origin of the law of causation, the author's
phy of Mind and Philosophy of Knowledge (as already referred
e also Galton: Inquiries into Human Faculty; Ribot: Dis-
f the Will; Hazard: Causation and Freedom in Willing;
: La Liberté et la Déterminisme; Wiese: Die Bildung d.
; Schellwien: Der Wille die Quelle d. Bewusstseins.]

CHAPTER XVIII

TYPES AND PRINCIPLES OF MENTAL DEVELOPMENT

The phenomena of man's mental life exhibit to the trained observer an almost indefinite variability. This truth applies to different individuals, whether we consider (*a*) the variations in the most elementary psychical processes, or (*b*) the various combinations of these processes into so-called "faculties," or (*c*) the entire course of development which is followed in the life of the individual. In spite of this variability, however, the existence of a science of psychology implies the possibility of reducing the phenomena to some common terms.

The foregoing remarks apply even to normal individuals. Besides these, however, there are not a few cases which show marked development of certain characteristics amounting to mental "idiosyncracies." Such are the musical or mathematical prodigies, those born with strong tendencies to strange crime, or the men and women with rare natural gifts and talents — not to speak of the geniuses. Moreover, all *normal* individuals (if we are to use this somewhat vague adjective) are at times subject to variations in the principal characteristics of their mental processes which deserve to be called more or less *abnormal.* The use of these contrasted terms — "normal" and "abnormal" — is necessarily somewhat vague. Some psychologists, for example, would hesitate to speak of the phenomena of dream-life as abnormal; and, indeed, the psychology of dreams, so far as these ena have been subjected to scientific investiga- es not depart essentially from the psychology of conscious states. It is now known also that a nsiderable proportion of individuals may, without ifficulty, be made the subjects of hypnosis. And repeatedly had occasion to remark how illusions lucinations mix with the ordinary consciousness persons.

ite of this indefinite variability, and in spite of ossibility of drawing hard and fast lines between nal and the abnormal processes of mental life, we cover in this life certain —

and General Principles. — In a somewhat rough viceable way it is possible to group individual together under very general classes. It is also to regard all the forms of mental development — nation of faculty and the combined growth of s," as subject to a few general laws. The re-under the last three of these groups, we are guided by certain physical facts which it is, in all ordinary circumstances, not impossible to ascertain. But the study of the correlated psychical facts leads us at once into doubtful and disputed fields of investigation. A certain amount of definiteness, however, must be allowed to both the current and the more scientific conceptions of the "male" and the "female" disposition or character, the psychical characteristics of childhood, maturity, and old age, the ways of thinking and feeling that are peculiar to the Oriental or Occidental, the Anglo-Saxon or the Latin, mind, etc. In dealing with the matter of temperament both the psychical side, and the physiological basis of the distinctions made, are obscure and shifting. It is not at all strange, then, that the psychology of the mental "types" belonging to any one of these four groups is scarcely to be spoken of as a *scientific* affair.

One can scarcely speak of "laws" in psychology, in the sense in which this word applies to the phenomena treated by the physical and natural sciences. This inability seems to be chiefly due to two causes: (1) the combinations of influences which enter into the developed mental processes are so subtile and manifold as to make the reduction of them to any system of definite formulas exceedingly difficult; but, more especially (2) the mind, considered as the subject of laws called mental, is also known as the willing subject, and so as deciding, within not easily assignable limits, its own course in development. It still remains true, however, that certain principles of universal character and profound import appear in control, so to speak, over all the activity and growth of every individual mind. These principles may then be said to belong to all human mental development.

A study of the mental processes of man, considered in levelopment and from the highest attainable points w, leads to the recognition of at least four such ples. These are the principles of Continuity, Rela- Solidarity, and Teleological Import.

modern scientific interest in all the various "abnormal" phe- of mental life is most promising. But the psychologist, who rmined to maintain the truly scientific attitude toward such iena and toward the study of them, will avoid two extremes. one hand, he will not refuse to entertain evidence as to all facts; nor will he remain stolidly resolved not to allow any of evidence to swerve him from his present theoretical posi- to the nature and the possibilities of the human mind. But other hand, the true scientific procedure in psychology, as in ther form of science, is from the known to the unknown, from ady explained to the still unexplained. The further the stu- psychology advances into his science, the more, in our judg- loes he become convinced that the causes of seemingly new ies (in telepathy, clairvoyance, double consciousness, etc.) are to ht by following clews which are already in hand.

mental constitution and development due to inherited characteristics of the bodily organism.

It must be confessed that there is great difficulty in placing the doctrine of temperaments, in the form in which it has just been stated, upon a truly scientific basis. On the whole, however, modern science seems to favor some such doctrine. The study of human physiology and psychology, in their joint work, requires us especially to emphasize the following two sets of considerations: (1) It is the original constitution of the *nervous system* in which the basis of differences in temperament is laid. Different nervous systems differ, "naturally," as respects the degree of their sensitiveness to stimuli, the rapidity and duration of their response to different stimuli, and the facility with which certain combinations, rather than others, are made by the central organs. But, of course, no nervous system can be considered as functioning independently of the other bodily organs. Three other systems of organs, as they get expression in the nervous system, are particularly concerned in the determination of every individual's temperament: these are (*a*) the vaso-motor, (*b*) the digestive, and (*c*) the muscular.

But (2) we have already seen that the psychological doctrine of the development of will leads us to distinguish character from the original mental "constitution" (as we vaguely say), built upon a basis of inherited characteristics. Men's characters change; or, rather, men change their characters. But the doctrine of temperament requires us to admit something permanent which changes of character may partially conceal, or overlay, but cannot change. All this is doubtless very vague and difficult, or impossible, to follow into details. But, on the whole, it seems to warrant this conclusion: *Self-determination as respects character is limited by that determination of the Self which reposes upon an inherited physical* *tion.* Every individual can do something, perhaps oward "the making of" his Self; but in all such ne is limited by certain original and unchanging ies, that are embodied in an inherited nervous as itself influenced by the characteristic vaso-digestive, and muscular functions of that particular ual.

inquiry be made as to a more precise description of those in the reactions of the nervous system which enter into the ion of the different temperaments, it is not difficult to distinguish the following: — variables (1) in the kind of reaction; (2) in ure of sensitiveness shown; (3) in duration and conservative r laying the basis of cerebral habit; (4) in rapidity of produc-) in completeness of reproduction; (6) in rapidity of combina-) in the kinds of combination most favored; but especially e characteristic accompaniments of feeling.

of Temperament. — Considering the indefiniteness of ole subject there has been a remarkable agreement and the forms of conduct as well as the conscious states are less liable to change. These are the men of *choleric* temperament. Still another type is characteristically sluggish, the opposite of lively and versatile; although it may be either tenacious or lacking in respect of what is called will. To such the name *phlegmatic* has been assigned. The fourth type is less easily described. It may be called the *poetic* temperament. Persons of this type are lively in imagination, susceptible to impressions of sense, moody in feeling, uncertain in conduct.

It is interesting to notice that one set of terms for the various temperaments is astrological in origin. In being born under the influence of the different planets the older theory found a sufficient reason why one man should be "Jovial," another "Saturnine," and still another "Mercurial," in temperament. Some advance was made in the explanation of such constitutional differences, when they were ascribed to the circulatory and digestive systems. Thus the sanguine or "full-blooded" man differed from the phlegmatic or "full-phlegmed" man; and as well from the choleric or melancholic man who was "full of bile." A mixture of such influences seems to have been imagined at work in the case of him whom Shakespeare describes as of "that surly spirit, melancholy," which "baked" the blood and made it "heavy, thick."

Even so modern a psychologist as Wundt thinks that the conception of temperament may properly be applied to different ages and races of men, and to different species of animals. Undoubtedly youth is more naturally sanguine or sentimental, maturity more choleric, old age more phlegmatic. In general, women are more sentimental; men more choleric. Perhaps one might venture to call the French characteristically sanguine, the Dutch phlegmatic, the English a mixture of phlegmatic and choleric, the Japanese sentimental. But neither in individuals nor in races do we find any of the types perfectly "pure"; and so examples taken from each class shade away into each other.

erences of Sex. — The fundamental physical differ-
of the two sexes are, many of them, obvious enough.
h differences some are nearly constant, some periodic,
ome epochal. The minuter histological and the
d functional differences are very numerous and
ess influential; but they are difficult as yet to
sh in a thoroughly indisputable and scientific way.
birth onward, through all the ages to maturity and
e, the average brain of the male surpasses in size
eight that of the female. But this difference seems
hiefly expressive of the difference in the total weight
e of the body, and in the amount and adjustment of
lar development.

se grosser bodily differences of the sexes are very
ant in determining a variety of rather massive psy-
differences. Taken together they make up a charac-
ally different basis for mental development. The

sanguine or sentimental; the masculine more probably choleric or phlegmatic. There are, however, marked instances of all the four kinds of temperament to be discovered in both sexes. As a rule, the sexual differences interpenetrate the different temperaments; so that the sanguine man differs from the sanguine woman, the choleric man from the choleric woman, etc. It is undoubtedly among males of a sanguine or sentimental temperament that most womanish men are to be found; and it is masculine women that are more likely to be choleric or phlegmatic in temperament. Such differences as these are plainly, to a large extent, characterized by the habitual forms of emotion and sentiment. It is to literature, and especially to poetry and the novel, that we must go for the more satisfactory descriptions of the sexual differences in all those forms of the life of feeling which both sexes share in common. For such descriptions are rather matters of art than of science.

The psychologist can scarcely discuss the question of differences of sex, in respect of the higher intellectual faculties and the life of conduct,—unless, indeed, he takes his psychological insight into the reading of history and biography, and into the general questions of ethics, anthropology, and the evolution of society. Here, in our judgment, the conviction will be deepened and enlarged, that what has thus far been found true in science, philosophy, and art, will continue essentially unchanged for a long time to come. In these spheres the differences of man and woman, in the amount of productive activity and in the characteristics of the work produced, will probably undergo no essential alteration. The forces which result in these differences lie too deep to be "trained out" of the race. They themselves set the conditions, and they should be followed as the guides of all the process of training. What faculties *are* "higher," and what conduct *is* ally "better," constitute preliminary inquiries into ch descriptive psychology is not bound to enter.

e wish, however, to record our protest against the heat and preju- which render it so difficult to secure any satisfactory discussion of so-called "woman question" from competent sources. We wish to express the belief that, both on the physiological and on the hological side, the differences between the two sexes are minute influential, and that they pervade the entire psycho-physical con- tion. The proposal to train away these differences, or greatly to them by changing the environment, we consider vain and foolish. distinction in sex pervades every form of life; it is itself a dis- ion on which the most fundamental biological differences are d.

ifferences of Age. — All the previous descriptions of book have taken the matter of age largely into ac- nt. This belonged of necessity to our study of mental as a development. It has been characteristic of all study, however, to recognize that the birth of mind istic of the different ages. The following general truths should, however, be borne in mind: (1) The organs of the nervous system of the infant, especially the end-organs of sense and the higher central organs, are, at birth, developed far in advance of any corresponding psychical development. Their condition is not expressive of mental processes that have been; nor are their functions exact correlates of what is. *In its constitution and functions the nervous system of the newly born human being is prophetic of what is to come.* (2) The earlier conscious processes of the infant are mainly of the impulsive and instinctive order. They are the functioning of a psychical mechanism which is dependent upon the excitement of the sensory-motor centres of the brain. But (3) from the earliest dawn of consciousness discriminating attention is at its organizing work. It is fitfully and feebly, but none the less surely, beginning the wonderful task of forming those faculties which, in their organic relations and growth, constitute a human mind. (4) Inasmuch, then, as we cannot get this progressive organization of mentality out of the confused and chaotic material of sensation and representation, and yet can never put our finger upon the moment when what we call mind begins to be, we are obliged to assume it as a principle operative from the beginning. The psychologist cannot say: "Look, just now, and there; and you will note the first beginning of a human mind." He can only say, in acknowledgment of the limits of all his descriptive and explanatory history of the mental processes: "*In the beginning was Mind, already equipped to receive sense-impressions, to attend, to discriminate, to feel, to form its own faculties of the more complex and higher sort.*"

Differences of Race. — We have just referred to the attempt to ascribe different temperaments, as characteristic to the different races of men. That this, and all similar attempts have some sure basis in facts of experience, there d reason to doubt. The truth is of interest to y of the most general kind, as showing how d are the types of development of which human is capable. But the applications of this truth the field of comparative or race psychology.

already been said that we can scarcely speak of s ruling over the mental development, in the aning in which we apply such a phrase to the determination of the behavior of things. But logy is not as yet prepared to match physics or with a show of general formulas that are made same approximation to exactness, and that may in unmistakable mathematical terms. And y is a biological science. It aims at the descrip- orderly history of a peculiar form of life. The asons for excusing its confessed inability to lay *garded as a development, no breaks or sudden leaps are found, whether as between its processes and so-called faculties, or between the successive states and stages of this development.*

This principle of continuity applies to the different fundamental processes of the mental life. These processes may, indeed, be distinguished; they may even be considered as separable factors of each individual complex state. But they all fall under the principle of continuity. The different classes of sensations show a tendency to arrange themselves in "scales," in which shades of quality merge into each other, so that the distinctions are not absolute. This is especially marked in the senses of sight, hearing, and touch; but suggestions of it are not wanting in taste and smell, as analyzed by modern experimental methods. In all the psychological doctrine of the intensity of sensations, it is the "differential" unit, the "least perceptible difference," the nicety of the grading of the quantity, which is the important thing. All kinds of sensations, as respects their quantity, may be arranged in continuous series, the different members of which are experienced as contiguous.

Turning to the aspect of feeling, we are met with the apparently irreconcilable opposition between pleasure and pain. Here, however, the continuous character of the scale of intensity helps to soften the opposition. Moreover, the primary forms of emotion shade into one another by almost imperceptible degrees. In the more complex emotional conditions, the presence of common and characteristically like elements of "bodily resonance" forms another class of connecting links. While of the higher and purer forms of sentiment we are often unable to say whether they are most properly classed as intellectual, or æsthetical, or ethical, or religious.

In treating of the development of mental life we recog-

important distinctions involved in the doctrine
alled faculties. But one of the most valuable
of psychological analysis is to show the presence
he elementary processes in the formation of the
s themselves, — although in various combinations
grees of perfect blending. Perception, for exam-
nnot be accomplished without involving ideation,
memory, discrimination, and conation. Some of
ost elementary processes shade into each other
manner that, as in the case of the biological dis-
between the plant and the animal, strict defi-
fails us at the extreme limits. Between **S**, the
on-original, and **I**, the image-representative, all
of life-likeness may be interpolated.

do, indeed, seem to reach a limit to the principle
nuity when we make the analysis of every mental
process into intellection, feeling, and conation.

origin in the actual, continuous activity and development of the one mind, functioning in its uniquely characteristic, three-fold way.

For, finally, the nature of all mental development illustrates and enforces the principle of continuity. What every mind experiences and grows into is not adequately to be described in terms of any number of functions, or faculties, regarded *merely* as functions and faculties. Its full significance is told only when it is recognized as the continuous development of a being which comes to know itself as a Soul or Mind.

The Principle of Relativity. — Closely connected with the foregoing principle is another, which may be stated somewhat as follows: *The character of every individual process, whether elementary or complex, and of every form of mental life, is dependent upon its relation to other processes and forms of the same mental life.*

The psychological principle of relativity must not be confounded with the metaphysical proposition, "To be is to be related" (Lotze), or with the theory that every conscious presentation is "essentially nothing but" a transition or difference (Bain). The principle means rather that no conscious process can be faithfully and fully described — what it actually is, and what it is worth, estimated and set forth — without reference to its place and its connections in the stream of consciousness. Mental states cannot be taken out of their relations to the life of the one Subject of them all. Although it is the task of the psychologist to consider these conscious states, "as such," they are never, in fact, *mere* states; they are always *somebody's* states, and are what they are, as related to other states of the same mind. The proofs of this principle are to be derived from all departments of psychology and from each example under each department. The psychologist's analysis resolves the mental life into of relatively simple and self-existent processes, haracteristics he proceeds to investigate: but the ntal life is not so. The processes which he labels , etc., are never, in fact, abstract and independently ; they are A, B, C, etc., instead of A_1, B_1, C_1, etc., A^y, A^z, etc., always and only in dependence upon tions they sustain to the whole alphabet of that ar mind's experience.

ch particular mental process, or conscious state, it so be held that its peculiar characteristics are de- upon the relation it sustains to the most nearly ous processes, or states.

rinciple of relativity has been much misunderstood and fre- nisstated. In the form which resolves all mental presenta- "nothing but" consciousness of difference, we agree with l in finding it unsatisfactory. But when this writer goes that "in passing from the scent of a rose to the sound of a the sting of a bee, we have no means of bringing the two

The Principle of Solidarity. — When, however, the entire mental life, regarded as an actual development, is taken into the account, we find it showing a constantly increasing tendency toward what may properly be designated as a "solidarity" of experience. In general the plasticity of the earlier stages of the mental development is lost; the characteristics of the prevalent psychoses become more definitely fixed; the reign of habit is extended. All this leads to the recognition of the following truth: *The effect of every partial or complete working of the psycho-physical mechanism is felt upon the character of the entire development of the mind; and this development necessarily tends towards some kind of unification.*

It is customary for psychologists to recognize a so-called "law of habit." But it represents the truth of experience better to say that the formation of a *system of habits* is both a primal necessity and also the resultant of the coöperation of the most fundamental principles, of both the bodily and the mental development. "Habit" is not a word to be applied to any one law; it is the essential idea implied in all psycho-physical laws.

In understanding the principle of solidarity these three classes of facts must be taken into account: (1) Every form of organic or more purely psychical activity, having once occurred, is more likely to recur again. The frequency of repetition, taken into relation with other habitual forms of action, measures in a rough way the strength of the tendency, or disposition, to act in a similar way.

But (2) profound changes in the conscious states accompany the frequent recurrence of any form of organic or more purely psychical activity. Of these changes may be noted (*a*) the modifications of the accompanying feelings which take place. Frequently repeated organic processes come to be differently felt, or not to be felt at all, when they recur. For (*b*) a decrease in conscious attention, and esitation which such attention often occasions, fol- pon the frequent repetition of any form of the physical life. Yet (*c*) promptness and accuracy e, as the necessity for conscious attention and dis- tion decreases. *The whole affair comes to be organ- to the psycho-physical mechanism.* But (*d*) even he habitual activity does not become quite purely ical, the process of ideation and of thinking which p to the movement becomes more automatic and condensed.

(3) the relation of the principle of solidarity to mation of character, and to the culture and satis- of the higher ethical and æsthetical sentiments, is portant. From the point of view of the "willing" e may speak of "forming" and "having habits." he point of view of this principle, we seem com- o speak of habits as "having" and "holding" us.

separately, show the principle of final purpose as ruling, more or less constantly and completely, over them all. We are not now speaking of any doubtful metaphysical theory. We are taking rather the biological point of view, as it falls to the scientific student of this particular form of life. *In some sort, the different forms of psychical processes constitute an organism; and activity to some purpose is the ruling principle of mental development.*

If the principle of final purpose were not observed in the construction of what we call the mind, and in the combination and development of those activities which psychology recognizes as belonging to the stream of consciousness, no *development* could possibly take place. To take one example of what admits of an indefinite amount of illustration, — if the impulsive and instinctive movements of the infant did not serve the purpose, not only of keeping alive its physical organism but also of stimulating, guiding, and developing the life of ideation and thought, no intellectual growth would be possible. And, indeed, every special kind of a psychical process can be understood only as it fits in with the others and contributes to a sort of unity.

But man differs from all the other animals in the largeness of the part which he, as the conscious subject of states, takes in his own development. The self-conscious, intelligent adoption of plans, and the selection of means, is the *acme* of his superiority, as a willing mind. These plans may include the control of his entire life in relation to consciously accepted ideals of an æsthetical or ethical kind. Thus he may become aware of an import to his entire mental development which reaches far beyond that development itself.

It is a combination of the principles of continuity, relativity, solidarity, and teleological import, which secures for every stream of human consciousness the unique aracteristic development belonging to a Soul, or

ingle volumes can be referred to, which treat of all the topics in this chapter. The following works may, however, be con- this connection. Wundt: Human and Animal Psychology; organ: An Introduction to Comparative Psychology; Ellis: d Woman; Mantegazza: Physiognomy and Expression; The Mind of the Child, Parts I and II; Perez: Psycholo- 'Enfant. On the last topics, see the author's Philosophy of

CHAPTER XIX

BODY AND MIND

On starting the examination of mental phenomena, which is now about to be concluded, it was said (see p. 4 f.) that certain assumptions must, of necessity, be made by the psychologist. These assumptions were partly such as are common to all students of every science, — namely, the possibility of knowledge, the existence of things to be known, and the general laws of thought as they apply to all investigation of truth, etc. Some of these assumptions, however, were more special to the work of the psychologist. Perhaps it is among the latter class that we should place the truth, at first taken for granted, which it is now proposed to submit to a brief work of revision. It may be summed up as follows: ***Psychology assumes the existence of the human body, as acted upon by things, the reality of the mind, and the actuality of causal relations between the two.***

Analysis of the Assumption of Body and Mind. — The truth which it has just been said is taken for granted by the student of the science of psychology, is by no means so simple as it appears. On the contrary, it is a very complex affair. The subordinate conceptions and principles, which are taken for granted as parts of the total assumption, may be sufficiently brought out by a not difficult act of analysis. For example: (1) It is assumed that a thing called "the body" exists, which is in some distinct way separable from other things, and also separable — at least in thought — from the existence called "mind"; (2) it is assumed that this body, while it must not be identified

ther things, is influenced or acted upon by them ;
is also assumed that, in some valid meaning of the
ve, the mind is a *real* existence ; and (4) it is as-
that actual relations exist between these two exist-
— between the body and the mind.

were proposed to make a thorough critical work
stigating this mass of assumptions, we should find
es involved in an extended treatise on metaphysics.
one of the principal "categories" would have to be
from the beginning ; — its origin discussed, its
y tested, its compatibility with its allied categories
ed. For surely here they all are : Being, Exis-
Relation, Action, Change, Force, Cause, Law, etc.
inasmuch as the work of systematic metaphysics
t belong to the student of "mental phenomena, as
we must refrain from the pursuit of the alluring
tions which psychology opens before us. But it

be actually existing between the body and the mind. What it is to be an actual existence; In what the unity of the mind consists, and how we are to understand and vindicate its reality; What it is to be causally (or otherwise) related, etc.,—these are the very questions with which metaphysics delights to busy itself. And *these* questions the psychologist must hand over to the combatants in the arena which is constructed for them.

The task of a scientific psychology is scarcely finished, however, until it has viewed again its own very complex but fundamental assumption. Especially appropriate does it seem to consider briefly the character of those *relations* between the body and the mind with which, as a large part of its own special field of investigation, modern psychology is accustomed to deal. But the character of these relations is largely dependent upon the conceptions which are formed of the two terms that enter into the relations. These are the Body and the Mind. We consider, then, first:—

The Conception of Body.—It has already been shown (p. 312 f.) how the average adult makes that "bi-partition" of all his complex experience which leads him to form the conception of his own body. The process results in his "splitting off" this particular thing from other things which do not in like manner belong to the "Self." And the continuance of the same process results in a further separation of a more subtile and limited kind; this is the "splitting off" of the body, regarded as itself a sort of thing from the Mind, or from the thinking, willing, and knowing Self. The popular conception of the body, as this conception is then constituted, has its basis in perceptions of sight, touch, and organic sensations; it is formed by precisely the same active process of primary intellection extended to logical thinking which is necessary for the formation of any conception. We may conclude, then, *“common-sense” notion of one's own body is, as both the elements of experience which enter it and hod of its formation, essentially the same as the f any other material thing.*

rse, there enter into the popular conception many more or less g bits of information (mostly of *mis*information) which are especting the real nature of that particular thing called “the ody.” Such factors are — some of them — now-a-days so persistently taught to every educated child that they come a part of his most essential conception of his own body. pecially true of the current notions respecting the brain and system. But it must not be forgotten that the most acutely and reflective human consciousness, if unaided by the f a complex and historical development of science, could n discover that any particular relation exists between the ss and mental development. Aristotle did not suspect this, he was the son of a physician and had himself made many ons of dissected animals. So far as the “plain man's con-s” of his own body separates it from the sentient Self, it *complex and obscure influences from internal forces and as modified by the action of their environment, attain temporarily a certain morphological and physiological unity, and go through a peculiar course of development.* Something like this summary is doubtless demanded by the discoveries of modern science. Psychologists and philosophers would do well to bear it in mind when they are discussing the relations of mind and body.

Relations of the Body to External Nature. — A brief reference to the foregoing statement of the scientific conception of body shows that this statement makes the body an inseparable part of its physical environment. It appears, indeed, to the child and to the savage, and in a modified way to us all, as an inseparable part of the real Self. (Comp. p. 318 f.) *But as science is bound to regard it, the body is an inseparable part of that Nature to which we in our developed cognition oppose the Self.* It is always the product, the construction, the child, the vehicle, — an actual portion that cannot be disjoined — of the great world of physical existences and natural forces.

The truth of the statement just made will appear at once more clearly, if we analyze the scientific conception of the body, Thus: — (1) Its elements are physical — the same kind of minute beings that compose the mass, or so-called "substance" of other things (oxygen, hydrogen, etc., and their compounds); (2) they are originally brought together into a system under the influence of certain very complex and obscure internal forces, physico-chemical and biological (among these, all that is vaguely included under "heredity," "variability," etc.); (3) they are modified constantly by the environment (including every force external to the body, from the surroundings of the first germ plasm to those of the adult organism); (4) the unity of the body is only morphological and physiological, and consists in a rather loose

ty adherence to a typical form and to a com-
of functioning; but (5) this unity is only tem-
and all the physical elements soon return from
stematic arrangement in the one body to other
ons with that Nature to which they all belong.

s to us the more necessary to insist upon all this, because
eories have emphasized some sort of a unity between body
at the expense of the undoubted unity which exists between
nd Nature at large. We call it "ours," to be sure; but it
temporary loan, which is constantly being called in piece-
which may be all called in at any time. Lotze's figure of
ich compares the human organism to a little whirlpool set
rief time in the great stream of natural forces, gives us the
ht in much better accord with scientific facts than do these
The linking of what we call our body to its environment
tinent and permanent thing upon which modern science
t to insist, and which it is able to describe in detail. As to
recise nature, or even the general fact, of its linking to the
consciousness, modern science has little beyond unproved

variety of reactions, that occur in response to the action upon it of a great variety of physico-chemical forces.

We turn now to consider in a word —

The Conception of Mind. — In some sort every psychological study, even of the most inconsiderable of mental phenomena, contributes toward the formation of a true conception of the nature of the human mind. How this conception develops and what it really comes to be for the average unscientific man, has been indicated in a preceding chapter (chap. XV). The fuller critical and reflective discussion of this conception belongs to philosophy. For such a discussion the student may be referred to the author's *Philosophy of Mind* (especially the chapter on "The Concept of Mind"). Here again we must content ourselves with a brief summary of what the appropriate science authorizes as the true content of this conception. It may be stated approximately in some such sentence as follows: *By "the mind" is understood the Subject of a conscious development which characterizes itself as a unitary being having its peculiar, self-known modes of behavior* — self-consciousness, memory, thought, voluntary action, etc., or the different forms of the so-called faculties of Intellect, Feeling, and Will.

Now if this conception be analyzed, we find that it, like the scientific conception of the body, contains no little metaphysics which may need further reflective consideration. But so much at least of metaphysics seems necessary in order to state, even in the most non-metaphysical way, all the important contents of the conception. These contents may be itemized somewhat as follows: (1) The mind knows itself as in some sort really existing; (2) it knows itself as in some sort a unity; (3) it is certainly subject to a course of *conscious* development which, in thought at least, is quite distinctly separable from that course of development through which the phy-ients, called the body, are passing; and (4) it own characteristic modes of behavior and attrib- to itself as its own powers, activities, faculties. as been both implied and abundantly proved in revious study of the actual development of the e. Every chapter in the book, and every chapter ook on psychology that ever was written or ever ritten, assumes and validates substantially the eption. We cannot narrow the sphere or con- results of psychological study so as to exclude rtant factors of this conception of mind. The hology" was, of course, full of it; but the "new y" cannot get rid of it. Psychology as a so- atural science" takes for granted thus much of ics; and the baldest and most agnostic ***solipsism*** ke much less for granted.

ly and mind — these two beings, thus conceived o" — *are* related. This fact of relation psycholwhich all men believe their bodies and minds to be standing toward each other is that called "causal." What it is to be related, and What it is to be a cause, are questions for metaphysics to undertake. Metaphysicians have no small difficulty, and no cool contention, in wrestling with these questions. Especially in considering the latter of the two, does theoretical psychology come against the physical conception of causation as embodied in the modern hypothesis of the conservation and correlation of energy.

Something has already been said, in the name of a scientific psychology, about the origin and nature of the conception of the causal relation (see p. 304 f.).[1] It is enough for our present purpose to add that it is just this causal relation, and no other, which is assumed to apply to the case of mind and body, by all common-sense experience and by all scientific and philosophical theory.

The use of words such as "influence," "induce," "occasion," "concomitant," "correlation," "parallelism," etc., does not in the least explain, but only obscures the facts, unless by these words essentially one and the same thing be meant. No psychology or philosophy of mind will ever be written that will be able to consider the relations of body and mind as otherwise than virtually causal. The reason for this necessity lies in the very nature of the mind itself and in the unchanging laws of its development. *The conception of causation* — although, or rather perhaps because, it is a very complex and somewhat shifty conception — *is the category under which our experience of body and mind develops, divides itself, and then binds itself together again in higher and more rational forms.* It is reflexion upon the experience of the two, as standing perpetually in this relation, which chiefly results in, and gives life-likeness and actuality to, the abstract conception of causation itself.

Another important point to notice concerns the *reciprocal* nature of the relation between body and mind. From

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[1] For more detailed philosophical discussion of this conception, see the author's *Philosophy of Mind* (pp. 212 f.; 223 f.; 230 f.) and *Philosophy of Knowledge* (*passim*).

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n the bodily organism as that this organism af-
mental processes. Not only the phenomena of
movement and the direction of attention, but
which emphasize the tendency of every process
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in evidence here.

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following great groups of correlations between
l mind will serve, however, to summarize the
ich our study of the mental life and of its de-
t has already discovered: (1) *The quality and*

the other point of view we must say, that the focusing and distribution of attention, and the voluntary movements of our organism, determine the succession and duration of those nerve-changes which the external stimuli occasion.

(3) *The phenomena of representative consciousness, as "recollection" and "memory," are correlated with the "dynamical associations" that have come to be effected between the different portions of the body, — especially the elements of the central nervous system.* But here, yet again, if we are faithful to all the facts, we are obliged to regard both the dependence of consciousness on the acquired, habitual reactions of the bodily organism, and also the dependence of those reactions on our conscious and voluntary pursuit of certain ideas in preference to others, and for selected practical ends.

(4) *The trains of association and of conceptual thinking are somehow correlated with the condition of the bodily organism, — especially of the centres of the brain.* The nature and limits of this correlation are, indeed, even more obscure than any of the three foregoing forms of relation have been found to be. From the point of view of self-consciousness, the indications of this correlation come through our experience of the difficulty of thinking and imagining as we will, under certain bodily conditions; and also through our equally undoubted experience of determining the trains of imagination and of conceptual thinking, as we wish or will to have them — and often in accordance with carefully selected ideas of what they should be.

(5) *The constitution and development of the bodily organism is correlated with the original mental disposition and with the mental development.* Here too, finally, what has already been said in all the latter portion of our work, and especially in the last two chapters, must afford a warrant for our conclusion.

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is body and that stream of consciousness we call
or mind, do not constitute anything similar; they
mount to a science uniting two species of objects
e class or kind.

nd Brain. — Modern science has done nothing to
e the general fact of relation between body and
has done nothing to alter essentially the concep-
ch we must hold of the general character of these
. But it has made one most startling discovery;
as apparently demonstrated, so that it can never
thrown into doubt, the truth of this discovery.

of ancient impressions, and of long existing but shadowy claims, the *science* of the subject is a growth of the last twenty-five or thirty years.

The modern scientific view of the assumptions involved in our most common and even constant experience has, therefore, changed the theme from a discussion of relations between a visible and tangible entity called "body," and an invisible and intangible entity called "mind," to a discussion of relations between functions of the cerebral substance and modifications in the stream of consciousness; and *vice versa*. This change has both simplified and complicated the problem. It has made the problem simpler because, instead of having to consider a great variety of organs, with their peculiar forms of functioning, in their varying relations to the conscious states, we may focus our attention and concentrate our researches upon this one organ (the brain) with its peculiar forms of functioning. But it has also made the problem more difficult and more complicated. For of all material structures the brain is the most difficult to examine and to comprehend in terms of physics, chemistry, and biology. What it is doing when it is, so to speak, laying the basis for the changes in conscious states, is almost entirely hidden from direct observation. And so far as we are at all able to frame a conjectural notion of these, its unique forms of functioning, they appear thus far to baffle the united efforts of all the chemico-physical sciences to reduce them to general principles.

The tendencies to affect the science of psychology which have resulted from this modern discovery of the vast significance of the brain for mental development have taken two directions. They have led some to conclude that the only scientific psychology is psychology as a "natural science." And by calling psychology a natural science they mean to affirm that it is a *biological* science in a very special way. The only causes of conscious states at which we can come in a scientific way, they affirm, are brain states. If, then, we wish to arrive at psychological *science*, we must know where in the brain, what as a

chemical changes, and how associated, are the particular
otions correlated with every kind of modification of con-
This fair vision of a deductive science, which shall be
dict definite conscious states as the necessary consequences
ates, hovers before some minds that have been captivated
lern discovery. On the contrary, the hope excited by the
scovery is met at once with the confession of the most
stigators: There is no *science* of brain physiology. But if
what faith can be placed at present in the conclusions of
"natural science" of psychology?

necessary to discuss again the nature of psychology, its
d its claims to be received among the brotherhood of
As a study of conscious states — their conditions, signifi-
order in development — psychology regards the relations
d mind with intense interest but with a well-moderated
reserve and of freedom. It desires to know what the
ory of the brain and its functions can tell as to the con-
nental development. But the fundamental questions as to
ations between the doings of the physical organism and the
the stream of consciousness are not, for it, in any respect
changed.

results in a body of knowledge, of growing definiteness and evidence, called the "localization of cerebral function."

Certain conclusions touching both these sets of relations between brain and mind will now be briefly presented.

The Brain as a Physical Mechanism. — Some parts of the human body — as, for example, the arrangement of the bones of the skeleton, the structure of the heart, the refracting and transmitting media of the eye — are most obviously to be interpreted as applications of well-known principles in physics. With the brain the case is by no means precisely so. It is, indeed, a mass constituted out of an almost innumerable multitude of physical elements, that are arranged into groups, or organs, between which connecting tracts can frequently be traced. Levers, valves, elastic fibres, lenses, etc., are, however, wanting there. Nothing is arranged so as to suggest structural "permanency," or a strict mechanical "unity," "vibrations" originated or "propagated," secretions made and "distributed," or anything properly answering to other like words that have been so often and so thoughtlessly employed. Yet all the evidence goes to show that this soft, and apparently almost unorganized mass within the skull is a *molecular* mechanism of the most amazing complexity and versatility in function. The microscope has revealed much as to its structural complexity; and physiological chemistry is doing effective work toward the discovery of the molecular and atomic changes which go on in this structure.

The chemico-physical sciences give us some such picture as this of that molecular mechanism which is the human brain. There are countless millions of elements in its substance; but they are, so far as its *peculiar* functions are concerned, all apparently of two types, — nerve-cells and nerve-fibres. These elements contain a large store rgy which has a highly complex and unstable al constitution. What is called their "excitement" s in a sort of explosive or slow decomposition of elements; and this process sets free the stored , to be expended in part upon the excitement of ng elements. A sort of hierarchy, however, belongs nerve-elements of the brain. What goes on there itself felt through the entire nervous system; and, means of the lower parts of the nervous system, very area of the body to which the nerve-tracts Conversely, what happens in these parts of the s system outlying the brain, makes itself felt in ve-elements of the brain itself.

rn research has not as yet been able to bring the peculiar trans- of the nerve-elements of the brain into full accord with what nces of chemistry, electricity, thermo-dynamics, etc., know e behavior of non-living things; or even of other forms of bodies, or any of their members, in a controlled and purposeful way, it is because the appropriate nerve-elements in the brain have responded to our ideas and volitions by doing the work of exciting the right muscles through the down-going nerve-tracts which connect them with these muscles. Thus the general work of the nervous system may be said to be that of *equilibrating the interaction of the different parts* of the body; and the special office of the brain is to do this work in accordance with the conditions of a conscious, mental development.

Moreover, the words which are so fitly but näively used to express the modifications in our *dynamic* consciousness — such as "stress," "effort," "fatigue," or being "used up," "gathering" and "outburst" and "lack" of energy, "summation," "interference," "inhibition," "ease" and "smoothness" or "hardness" and "roughness" of the time *we* are having, etc., — have their correlates in the dynamics of the brain. [For further details of the modern mechanical theory of the nervous system, see Part I of the author's Elements of Physiological Psychology, especially Chapter VII.]

Proofs and Results of "Brain-Work." — Although, as has already been said, a full and precise account of the character of the work done in the human brain cannot be given, there are abundant proofs that work is done there, and that this work is correlated with mental work. Of these proofs the following four may be noticed: (1) A large amount of the arterial blood is used by the brain; and if this supply is cut off or corrupted, the work of the brain stops or is disturbed. This stoppage or disturbance shows itself in corresponding modifications of the stream of consciousness. It has been calculated that, although the weight of the adult's brain is only about one-forty-fifth of his whole body, the supply of blood used up in the brain is about one-eighth of the whole supply. (2) In general, the amount of mental work done — of what we call conscious energy "expended" in thought or emotion — is measured by the amount of waste of tissue which results he correlated brain-work. We know that *we* have d hard; and the careful measurement of the quantity hates and phosphates excreted from the broken-down tissue, shows that the brain has been doing increased (3) The rise of temperature in the brain-mass which panies all excitement of the stream of consciousness to indicate plainly an increase of work done in the This thermic disturbance is slightly different in fferent areas of the brain; it is likely to be greatest occipital region and when due to emotional excite- it cannot be accounted for fairly as the effect merely eased circulation. But (4) it has been demonstrated ual measurement that the prolonged and severe ex- nt of the nerve-cells produces a decrease in their e and a change in the character of their substance. rom use is followed by a resumption of the normal d character of the nerve-cells. And although such nerve-cells of the spinal ganglia of frogs and cats almost fifty per cent. by five hours of stimulation. He also found that, in the evening, the fatigued cells of animals which have been active all day (such as English sparrows, pigeons, honey-bees) have greatly shrunken and changed in their apparent molecular constitution.

The bearing of such discoveries on the hygiene of the human nervous system — food, sleep, abstinence from frequently recurring and intense emotions, etc. — is so obvious as to need only a mention.

Significance of Size and Complexity of Brain. — A great amount of pains has been taken to establish generalizations regarding the size and growth of the human brain, and the amount and stages of intellectual development. This labor has not been altogether fruitless, but it cannot be said as yet to have attained its end. If we compare the weight of man's brain with that of the brains of the lower animals, the results are confusing. The absolute weight of the human brain (in the normal adult, from somewhat more than 1200 grammes to somewhat less than 1400 grammes) is greater than the weight of the brain of any of the lower animals, except the elephant and the whale. If the fairer standard of weight of brain relative to body-weight be adopted, and a scale prepared to include many widely separated species, the result is still disappointing. Man stands well in the scale. But the relative weight of the brain is not greatly different in the dolphin, the baboon, and man. And in such a scale the elephant stands lower than the salamander or the sheep.

If we compare the different races as respects brain-weight we have the following result: average in grammes of European males, 1340; Oceanic, 1293; American, 1282; Asiatic, 1278; African, 1268; Australian, 1190. Suppose it be admitted that the two extremes of brain size, as here given, measure fairly well the extremes of intelligence; as Professor Donaldson has said, we should not be satisfied to arrange the intelligence of the intermediate groups by the same scale. Besides, the average weight of the adult female European is to that of the adult male European about as 1220 to 1340 or 1350; and a table which compared the two sexes would put the European female on about ıe level with the Australian male, "thereby suggesting that rence from brain-weight to intelligence is not a happy one."

n comparisons of gross size and weight two conclu- however, may be drawn and defended by the facts: hen the brain-weight of the adult falls below a certain indefinite limit, — 1000 to 1100 grammes in the male, 00 to 1000 grammes in the female, — this deficiency ificant of a deficiency in mind and in capacity for development. (2) The fact that the brain of the s absolutely larger than the brain of the female, in of all differences of race and at all the different of growth, is significant of some corresponding dif- e in, at least, the more general characteristics of cal life and development. The problem of sexual nce is, however, a very complex one. And since ference in weight of the brain is quite balanced by ference in gross weight of the entire body, it seems

Growth and "Education" of the Brain. — The growth of the brain is undoubtedly connected in a most important way with the mental development. Certain facts are succinctly stated in the following quotation from Professor Donaldson: "At birth the weight of the encephalon is nearly alike in the sexes, and in both growth during the first year, and indeed during the first four years, is rapid. By the seventh year the encephalon has reached approximately its full weight, the subsequent increase being comparatively small. There is no other peculiarity in the growth process of either sex, unless later observations should show that the approximation of the curves at fourteen years is really significant. . . . Should this curve be extended to ninety years, there would be found nearly the same weight of the brain persisting up to the onset of old age (about fifty years), when there appears a loss in weight, which becomes rapidly more evident, so that the smaller brain weight of the aged must represent a percentage of loss in some instances quite large."

Certain conclusions of great apparent interest to psychology are suggested from the history of the growth of the normal brain. In its structure the cerebral development is all made ready for use before it comes into contact, through the organs of sense, with the stimuli provided by external nature. The nerve-elements of the cerebrum are formed before the child is born; although they are not by any means all developed to maturity. After birth, therefore, the growth of the brain consists in the enlargement and maturing of its elements; and the education of the brain consists in the establishment of habitual forms of reaction to excitement, and of "dynamical associations" or combinations in functioning, on the part of these elements.

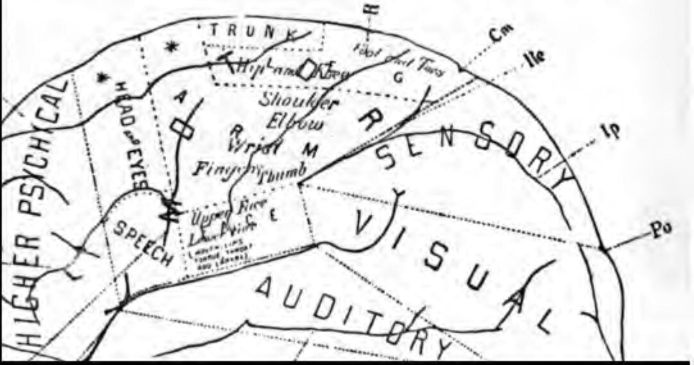
Turning attention now for a moment to the meaning of all this as affecting the modifications of the stream of ousness, the following conclusion seems suggested: *unctional development of the brain depends upon aracter of the excitements to which it is subject, and he constitutional and acquired character of its asso- reactions; these latter are, however, in a measure lent upon the character of the conscious states and of development; therefore what we call the mind deter- in a measure the characteristic functional develop- f the central nervous mechanism.* In more popular ge we may say that, within certain limits, we deter- he growth and education of *our own* brains.

lization of Cerebral Function. — For a considerable efore the proofs of modern science began to accu- it was suspected by many observers that all the of the brain were not equally concerned in, or l to, the different characteristic forms of mental ses. The extremes of the older school of phrenolo- (Gall, Spurzheim, etc.) had brought about such a different areas of the brain's hemispheres are specifically related to different mental processes, or to different factors in the complex mental processes. The precise character of this relation the theory does not claim to establish; with the metaphysics of the suggested problems it has little or nothing to do. In a word, work must, in all ordinary and normal cases, be done in certain more or less definitely (yet as a rule, if not always, somewhat vaguely and shiftingly) located portions of the brain, if the correlation between particular processes of the mind and the brain is to be maintained.

Evidence for Cerebral Localization. — We cannot enter into the details of the evidence for the theory just announced. It is enough to say that this evidence is, in the main, of three kinds: (1) experimentation, (2) anatomy and histology, including the study of the brain of the embryo and the infant, and (3) pathology. The first kind of evidence shows what particular sensory-motor activities are occasioned by stimulating certain definite areas of the brain, and what activities are impaired or lost by extirpating the same areas — in the case of the lower animals. The second kind of evidence consists in tracing the connections between the different cerebral areas and the corresponding organs of sense, or amongst the cerebral areas themselves; and so inferring their functions from the observed facts of nervous connections. The evidence from pathology is gathered by a careful study of selected cases where disease or injury of the different brain areas, in man, can be correlated with the impairment or loss of characteristic mental processes.

It must not be imagined that the indications of all these forms of evidence are equally clear or always conclusive; but little by little the knowledge of the true state of the case has been approximately won. Experiment suggests the problem; histology, and especially pathology, afford the conclusive answer.

lusions as to Cerebral Localization. — The accompany-
agrams (24 and 25) present to the eye the present
ng of the most acceptable claims of modern science
icate what parts of the brain's hemispheres are
lly concerned in the different specific forms of
cal processes. These diagrams should not, however,



they do not act in isolation. (3) Within certain limits the principle of "substitution" applies. If any one of these "centres" becomes impaired, the most nearly contiguous parts of the brain, or the corresponding parts of the opposite hemisphere, or the parts most closely allied physiologically, may "help out" the impaired member of the cerebral organism.

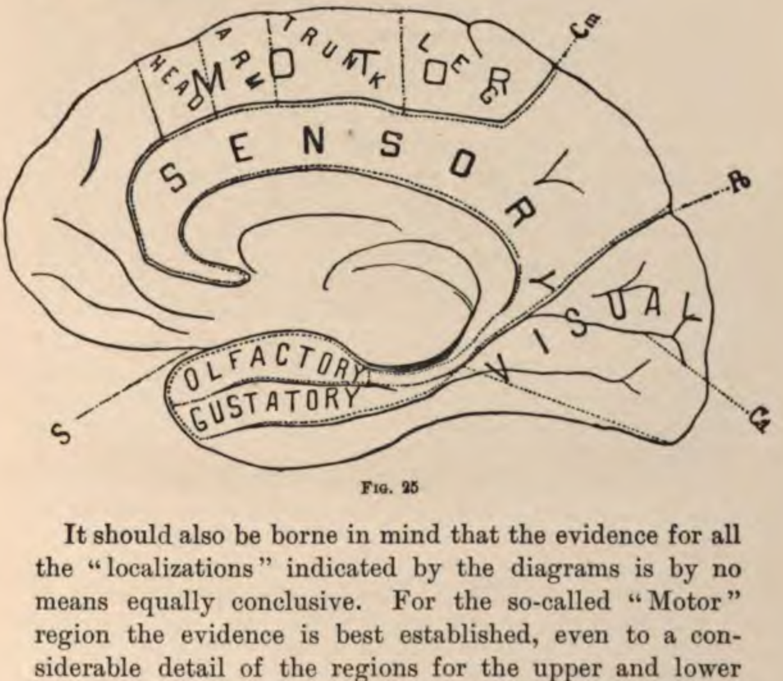


FIG. 25

It should also be borne in mind that the evidence for all the "localizations" indicated by the diagrams is by no means equally conclusive. For the so-called "Motor" region the evidence is best established, even to a considerable detail of the regions for the upper and lower limbs. The general "Sensory" region for the trunk and limbs overlaps the motor, but on the whole lies somewhat further back. The so-called "Visual" region probably stands next in its claim to be established upon unimpeachable evidence; although the motor activities involved in "Speech" may perhaps claim to stand upon equally good grounds. From this point onward the theory of

alization of other cerebral functions can only claim
nishing amount of convincing evidence; until we
o the so-called "higher psychical" functions, which
argely, at present, assigned to the frontal regions
k of any other work which can be given these
to do.

recently (1894–96) Professor Flechsig has advanced claims
toward what he is pleased to call "the localization of the
processes," and which he proposes to extend and defend
by subsequent publications of the evidence and of the results
research. This investigator would divide the entire hemi-
of the brain into two great divisions. All the centres that
do with the various forms of sense and with the correlated
of the organs of sense, he would group together under the
e "sphere of bodily feeling." This "sphere" is the repre-
e in the upper part of the brain of those areas in its lower
ich are concerned in the automatic and reflex, but not intel-
d "apperceptive" action of the same sensory-motor organism.
re, it is the essential organ of self-consciousness. The remain-

invisible entities and mighty but mysterious forces of the physical universe. In this universe the unity of the body is only formal and temporary. The science we are studying, however, shows how the ongoing and developing consciousness constructs from the materials of experience the conception of a spiritual Self. This conception psychology finds penetrated with assumptions as to its own being and unity, and as to the reality of a world of things with which this Self stands related. These relations of the Self to the world of things are all, so far as modern science now knows, *through* the body. The researches of modern psychology end, therefore, so far as this line of its researches is concerned, in the discovery and statement of *a great and indefinite variety of relations between the body and the mind.*

The *science* of psychology is, accordingly, a consistent dualism to the very last. The theory how two such courses of development — the one of a being which is known as the product of the physical universe and the other of a "stream of consciousness" that comes to know itself as a feeling, willing, and knowing Self — can stand related to each other in manifold ways, the psychologist, so long as he remains on the standpoint of his science, turns over to the philosopher.

[For the more detailed study of the subject of this chapter, see Donaldson: The Growth of the Brain; and the author's Elements of Physiological Psychology, or Outlines of Physiological Psychology, — together with the numerous treatises referred to in these works. The philosophical problems suggested are fully discussed in the author's book on the Philosophy of Mind, and in several chapters of the Philosophy of Knowledge.]

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